Mining CONGRESS JOURNAL

THE AMERICAN MINING CONGRESS

AUGUST 1948

How Engineering Selection and Design of BELT CONVEYORS Improve PERFORMANCE

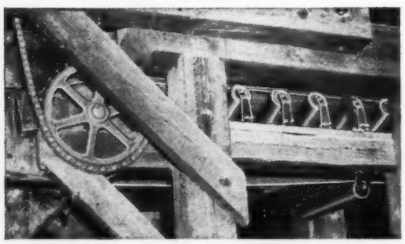
L-B belt conveyor carries magnesite ore from mine dump to crushing plant.

SUCCESS of Link-Belt belt conveyor installations in raising production rates and cutting handling costs, with a minimum of maintenance, is due not only to the most advanced design and construction of Link-Belt carrying and return idlers, but also to:

- properly designed terminal drive machinery.
- efficient discharge chutes at terminal and discharge points.
- a design of welded steel pulleys that reduces shaft deflection.
- highest mechanical efficiency in speed reducers, direct coupled or chain driven.
- engineering experience to produce the proper relationship between pulley diameter and ply thickness of belt; also between size of material handled and conveyor belt width, equality of rubber covering, carcass specifications, etc.

The user gets the benefit of this experience when he selects Link-Belt belt conveyor equipment—idlers, trippers, drives, pulleys, bearings, take-ups, belts.

In the crushing, screening and preparation of iron ore, copper, nickel, molybdenum, bauxite, gold, silver and other ores, Link-Belt conveyors handle the material from one operation to the next. Belt conveyors carry the ore out of open-pit mines. Steel for ships, cars, buildings and its innumerable other uses is rolled, cast, formed, with the help of Link-Belt conveyor and drive chains. Bucket elevators, skip hoists, apron conveyors, belt conveyors handle coal, coke, ore, stone, on arrival at the mill. Consult Link-Belt specialists on any phase of conveying or mechanical power transmission.



Top, left: Drive end and discharge chute of L-B belt conveyor.

Center, left: L-B rubber tread idlers on return flight of belt, loosen and remove sticky material clinging to belt.

Bottom, left: L-B impact idler, giving cushioned support of belt at loading point. Greatly lessens wear on belt.

LINK-BELT COMPANY 10.372A

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices in Principal Cities.

LINK-BELT
Conveyors
A TYPE FOR EVERY KIND OF MATERIALS HANDLING

As a superintendent I know from Experience..

The "Automat" is a real power saver because it uses only one motor of 25 H.P.

Competent coal mine superintendents, who keep an eye on operating expenses, like the Whaley "Automat" because they know its single 25 H.P. motor means big power savings. They like the "Automat" because it loads from 3 to 7 tons per minute with a power consumption of only 1/5 K.W.H. per ton . . . the lowest power requirement of any loader of equal capacity. How can a loader of this capacity be operated on only one 25 H.P. motor? Simple. The "Automat" is designed for perfectly balanced operation. There's no dragging or scraping parts to use up power. Only a smooth, swift, natural, shovel action that loads maximum tonnage with a minimum use of power.

For real power savings . . . for safe loading . . . for complete loader service, investigate the shovel action "Automat."

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Knoxville 6, Tennessee

Remember, the "Automat" loads, in its stride, any lump of coal that will pass through your tipple or any lump of rock your cars, aerial tram or larries can take.

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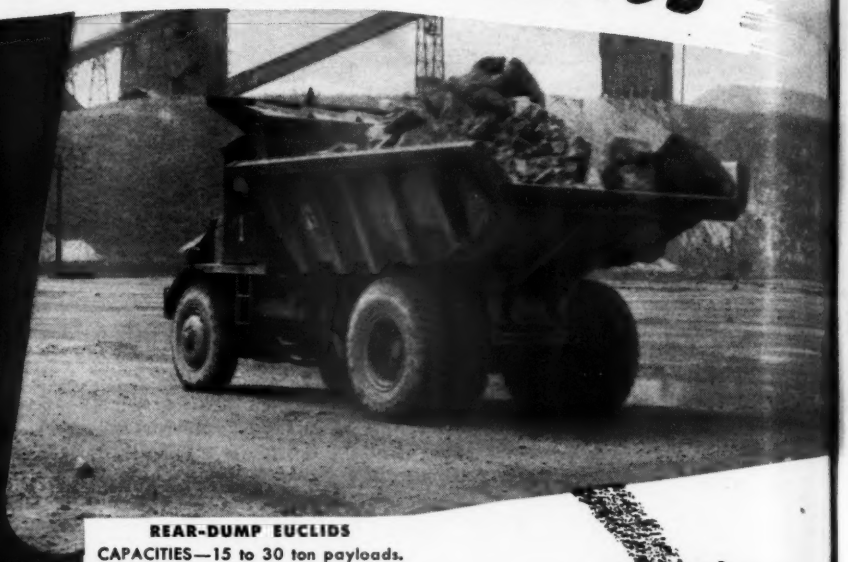
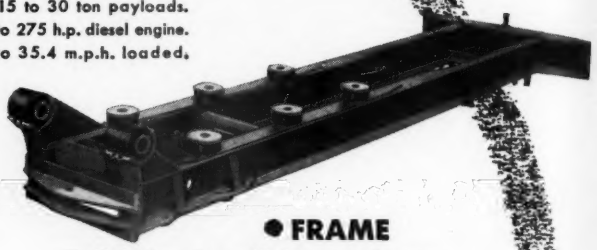
BIG LOADS
TOUGH HAULS

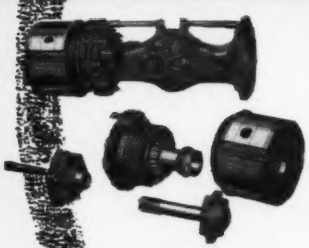


REAR-DUMP EUCLIDS
CAPACITIES—15 to 30 ton payloads.
POWER—150 to 275 h.p. diesel engine.
SPEEDS—Up to 35.4 m.p.h. loaded.



● FRAME

The Euclid frame is a welded structure of tremendous strength. Large rubber body support pads cushion the impacts of loading under large shovels and hauling capacity loads over rough roads. There is no metal to metal contact between body and frame.



● DRIVE AXLE

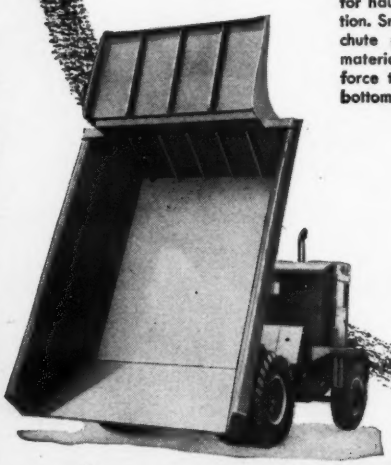
The planetary type drive axle of Euclid design and manufacture has been used on all Euclid hauling equipment for over fifteen years. It is unequalled for long life and continuous performance in off-the-highway service.

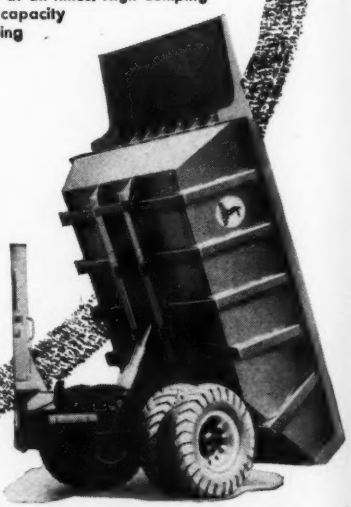
● BODY

Rear-Dump Euclid bodies are designed for hauling rock and heavy excavation. Smooth interior and flared rear chute provide unrestricted flow of material. Sturdy box sections reinforce the heavy body at sides and bottom.

● HOIST

The double-acting Euclid hydraulic hoist provides positive control of body at all times. High dumping angle and ample hoist capacity assure fast, clean shedding of the load.





The services of a hauling equipment specialist are available upon request and without obligation . . . write or call your Euclid Distributor.

The EUCLID ROAD MACHINERY Co., Cleveland 17, Ohio

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Opinions expressed by authors within these pages are their own, and do not necessarily represent those of the American Mining Congress

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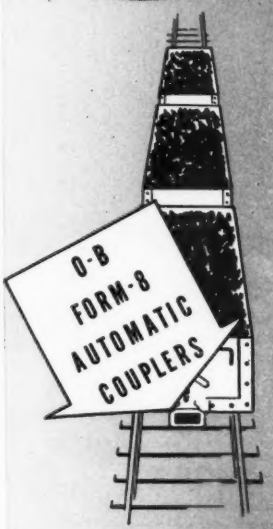
Member Audit Bureau of Circulation

3 Reasons why O-B Form-8 Automatic Couplers give your Mine Cars added Track Stabilit

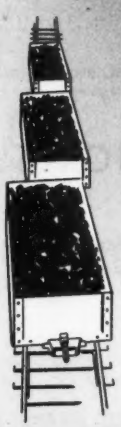
With the present trend to larger and heavier mine cars, track stability becomes an increasingly important consideration. Whereas older cars were usually light and easily placed back on the track, large, all-steel cars require considerable time and effort to re-rail after derailments. Faster operating speeds and heavier loads multiply the damaging impact of two cars banging together.

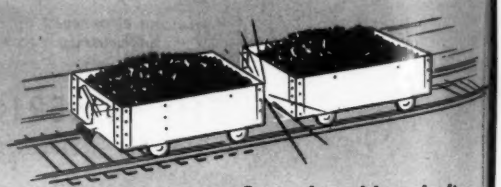
O-B Form-8 Automatic Couplers bring increased track stability to your mine cars in three important ways. First, cars are kept in center-to-center alignment under push or buff, lessening the chance for derailment. Second, since cars do not zigzag, car wheels do not tend to ride the rail, thus preventing excessive scrubbing and wheel wear. Third, Form-8 Couplers provide a cushiony rubber draft gear which will absorb impact blows up to 100,000 pounds — eight times the normal limit of ordinary steel springs.

If you want to get the most out of your haulage equipment, don't fail to take track stability into your consideration. Make certain your new cars are provided with this feature by insisting that they be equipped with O-B Form-8 Automatic Couplers. Write for free booklet 813-AM giving more complete information.

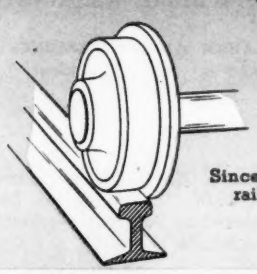


Instead of zigzagging under push or buff... Mine cars stay on the track in center-to-center alignment.

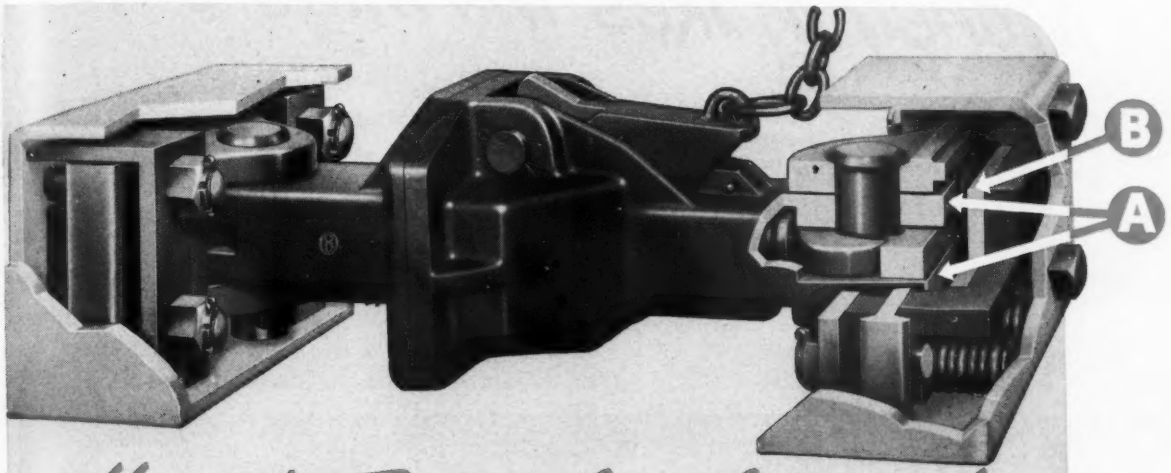




A sturdy rubber draft gear absorbs impact blows up to 100,000 lbs.



Since car wheels do not tend to ride the rail, wheel flange wear is lessened.



How the Form-8 Coupler works

to keep your mine cars on the track

A glance at the above cut-away picture tells the reason why O-B Couplers provide greater track stability. Cars equipped with links and pins or ordinary couplers push against each other through a single pivot point. Because of its tolerance between tread and track gauge, a car tends to zigzag. Pushing through a single pivot point magnifies this tendency, producing against the wheels a side thrust to derail. Notice the thickened ends of the O-B drawbar casting (A above). Notice also the steel plate (B) embedded directly behind in the rubber buffing pad. Under pull or light buffing pressure, a slight spacing between these two parts permits the drawbar casting to pivot about the clevis pin. Above 3000 pounds buff, the wide drawbar ends bear against the steel plate. This straightens the coupler bodies and holds the mine cars in center-to-center alignment.

Ohio Brass

MANSFIELD, OHIO

Canadian Ohio Brass Co., Ltd., Niagara Falls, Ontario

2760-AM

Money Makes the Mine Go!

You're looking at the "business end" of a modern coal mine. At processing plants like this one, coal is washed, sized, and loaded into railroad cars—ready for millions of consumers all over America.

The processing of coal is highly mechanized at America's progressive mines. In fact, machines aid the miner in *every* mining operation, from the time coal is first cut, far underground. It is *mechanization* that has made possible America's record-breaking coal production—in response to a record-breaking demand for coal.

To keep the country's coal supply in balance with requirements, the bituminous coal industry is pushing plans for even greater mechanization—and for opening new workings, for building new processing plants, for modernizing and expanding shipping facilities.

These essential improvements will cost huge sums—at least half a billion dollars in the next three years alone. Such expenditures will be warranted only if the mines are able to earn adequate profits. Indeed, most such "improvement dollars" must come directly from profits.

That is why it is so important that the industry's profit position be strengthened to build for the future . . . to assure every consumer the kind and amount of coal he requires and to prepare for the great *new* uses now in sight for coal.

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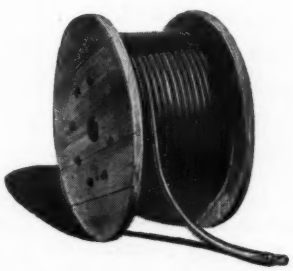
BITUMINOUS COAL . . . LIGHTS THE WAY . . . FUELS THE FIRES . . . POWERS THE PROGRESS OF AMERICA

when you . . . FIGURE IT IN ALUMINUM

the BIG difference is in your COSTS!



AND YOUR SUPPLIER HAS IT!

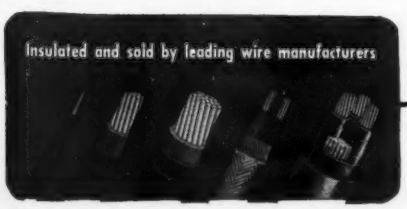
Big savings on your conductor purchases. A 1,000,000 cm insulated aluminum cable weighs about half as much as an equivalent copper cable and costs less.

First costs are lower—a lot lower. Transportation costs are substantially less. Wire and cable with Alcoa E.C.* Aluminum conductor are so much lighter.

This lighter weight means easier handling and reeling—less damage when insulated cables are "dragged".

Alcoa makes light, strong, conductive E.C. Aluminum. Leading wire and cable manufacturers draw, strand and insulate it, and sell it under their own trade marks. Ask your wire supplier about it, or write ALUMINUM COMPANY OF AMERICA, 1764 Gulf Bldg., Pittsburgh 19, Pa.

*E. C.: *Electrical Conductor* Aluminum



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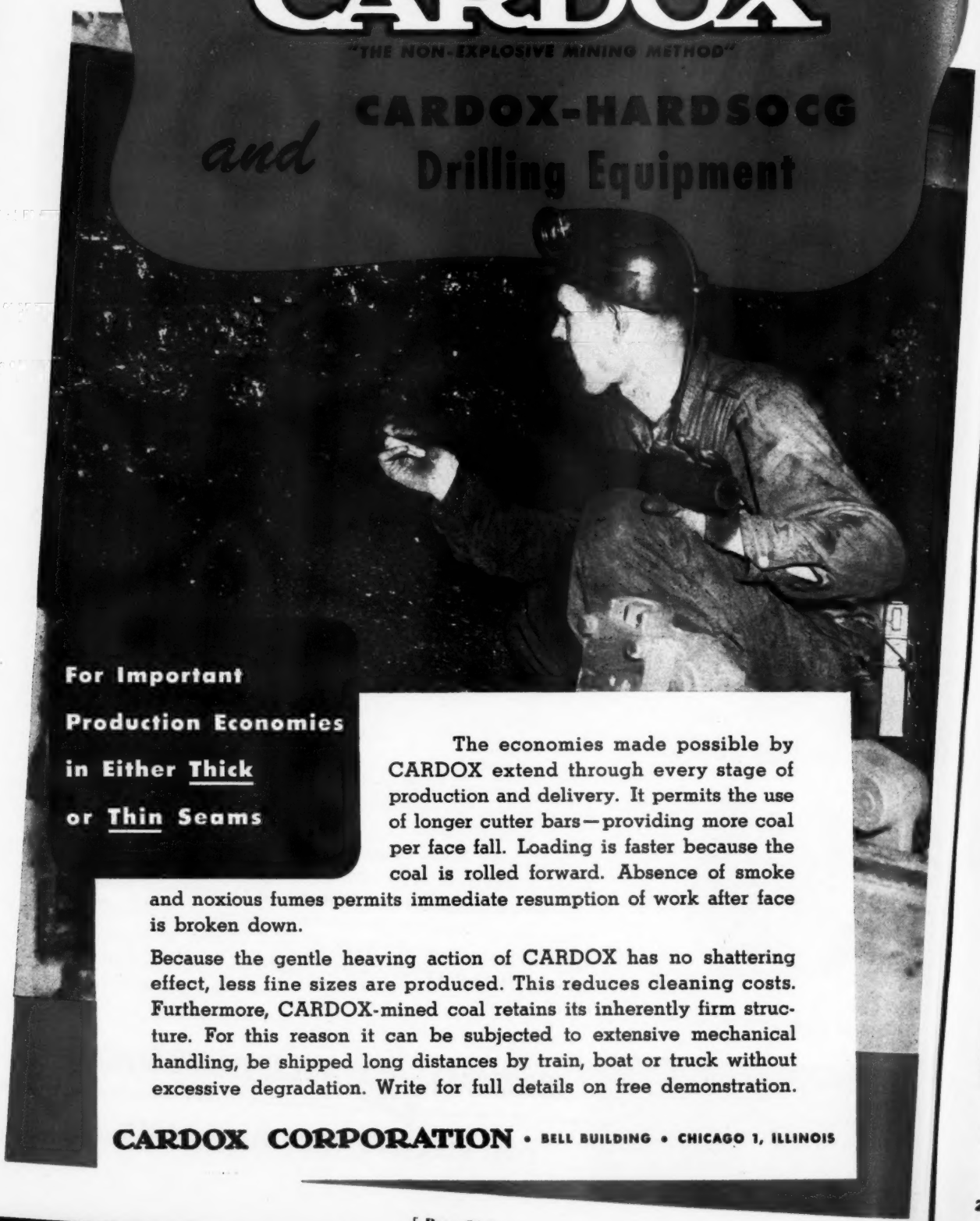
"THE NON-EXPLOSIVE MINING METHOD"

and CARDOX-HARDSOCG Drilling Equipment



For Important Production Economies in Either Thick or Thin Seams

The economies made possible by CARDOX extend through every stage of production and delivery. It permits the use of longer cutter bars—providing more coal per face fall. Loading is faster because the coal is rolled forward. Absence of smoke and noxious fumes permits immediate resumption of work after face is broken down.

Because the gentle heaving action of CARDOX has no shattering effect, less fine sizes are produced. This reduces cleaning costs. Furthermore, CARDOX-mined coal retains its inherently firm structure. For this reason it can be subjected to extensive mechanical handling, be shipped long distances by train, boat or truck without excessive degradation. Write for full details on free demonstration.

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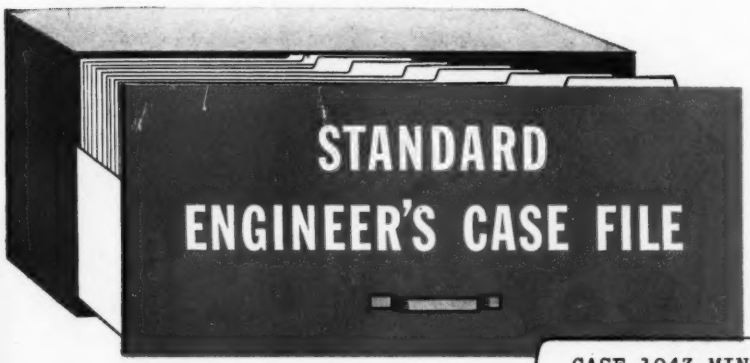
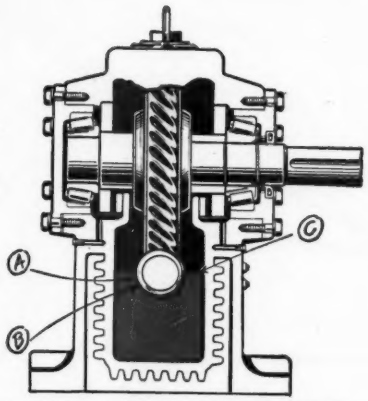


CASE 1043—MINIMIZING LEAKAGE IN LARGE ENCLOSED GEAR SETS.



AIR-COOLED WORM GEAR SPEED REDUCER

In heavy-duty industrial enclosed reduction gears the relatively high viscosity characteristics of Calol Gear Compound cut consumption. Efficient in both conventional and worm types and where such gears carry extra loads or are worn. Comes in eight grades: 60, 100, 120, 135, 150, 190, 225 and 410.

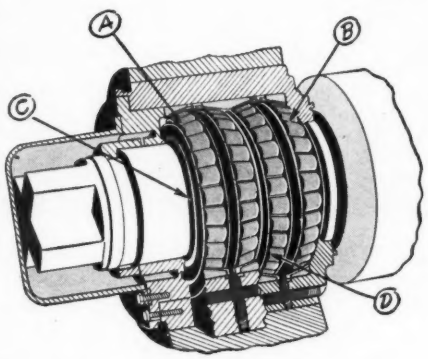
A. Oiliness and extreme pressure additives cushion shocks, prevent vibration, welding and extra wear.

B. Non-corrosive - will not harm bearing or gear metals.

C. Contains effective foam inhibitor - breaks bubbles that form and stops building up of pressure in case.

Calol Gear Compound resists high temperatures and retains good body in all operating conditions. Its numerous viscosity grades make it adaptable to a wide range of applications and conditions.

CASE 1047--KEEPING GREASE IN BEARINGS WHERE TEMPERATURES AND PRESSURES ARE EXTREME.



STEEL MILL ROLL NECK BEARING

When the temperature in a roll neck bearing reached more than 200°F., Calol E.P. Roller Grease did not run out. Excellent for all heavy-duty, grease-lubricated anti-friction bearings. Handles easily in pressure systems at all operating temperatures.

A. Contains extreme pressure additives. Lubricating film will not squeeze off under the heaviest loads.

B. Highly water-resistant - sticks on bearings even where excessive water is used for cooling.

C. Melts slowly and feeds evenly ... creeps into small clearances and assures adequate lubrication.

D. Will not corrode bearing metals.

Calol E.P. Roller Grease is made specially to meet conditions of heat and pressure too high for other conventional anti-friction greases.

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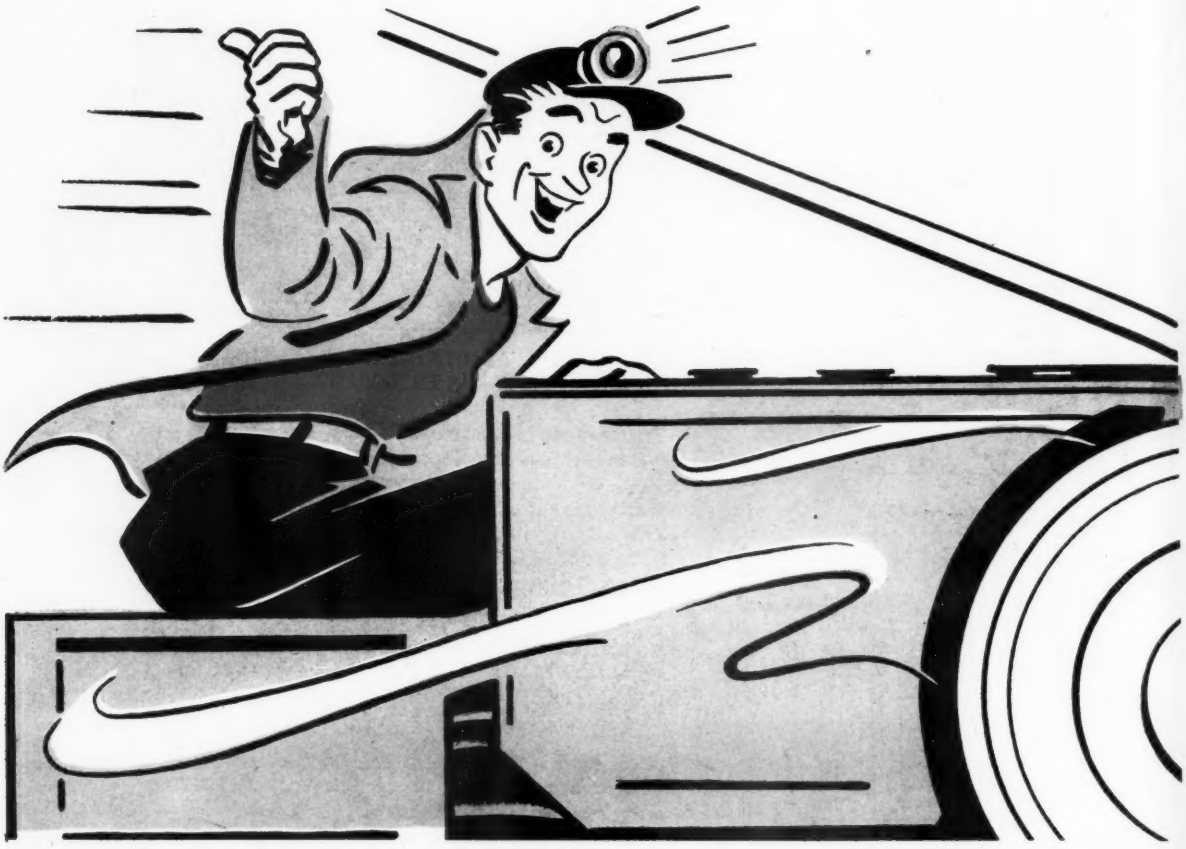


"these new mine cars really roll!"

"Since we got A.C.F. mine cars, I'm actually finishing every run minutes faster than I ever did before! Takes less power to pull a trip that rides on roller bearings, so my average speed is up! They're easier to start, too – these two-way bumpers cushion the shock when I start to pick up the weight of the cars ...it's not like breaking through a string of brick walls to get the trip moving. Yep... these A.C.F. cars can really highball a trip of coal."

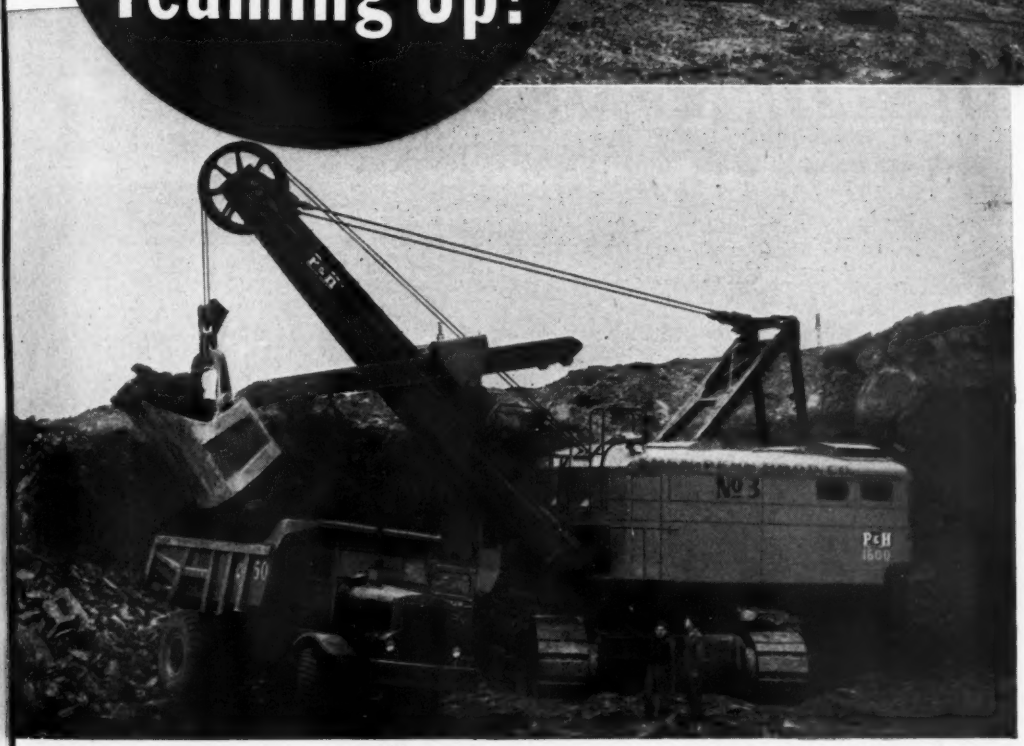
Call on your nearby A.C.F. Representative for help on your transportation problems. American Car and Foundry Company • New York • Chicago • Cleveland • Washington • St. Louis • Philadelphia • Huntington, W. Va. Berwick, Pa. • Pittsburgh • San Francisco

a.c.f. MINE CARS

for Greater Coal Output

the P&H's are Teaming Up!

P&H Model 1400 (4 cu. yds.) owned by the Shen-Penn Production Company at Shenandoah, Pa.



A new P&H 1600 (6 cu. yds.) teams up at Shen-Penn in the strip mining of anthracite coal.

In one location after another owners are reordering P&H Electric Shovels to gain important new operating advantages... For example: P&H's independent propel drive. Change from dig to propel is made instantly by merely flicking the master propel switch . . . there are no mechanical complications of transferring of power from one shovel function to another . . . no sliding gears or mechanical clutches . . . no gear shifting. Faster, easier move-ups with P&H's independent propel machinery mean less trouble, less time wasted. The machine keeps in more efficient digging position . . . cuts tonnage costs. Along with Magnetorque drive, it's another important P&H *added value.*

Every third P&H Electric Shovel sold is a repeat order

P&H

ELECTRIC SHOVELS

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LEADING THE FIELD IN ELECTRIC SHOVEL DEVELOPMENTS

Leading the way to greater production

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and speedy Shuttlecars

The extra tonnage that goes with modern mechanized mining can be yours . . . and at a saving. In more and more mines fast, flexible shuttlecars, powered by Exide-Ironclad Batteries, are upping production and cutting haulage costs.

With Exide-Ironclad Batteries in your shuttlecars, locomotives and trammers you get all four of these vital characteristics of a storage battery: high power ability, high electrical efficiency, ruggedness and long life. They combine to assure years of safe, dependable, day-in, day-out mine haulage service.

SAFE DEPENDABLE POWER

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If you have a special battery problem, or wish more detailed information, write . . .

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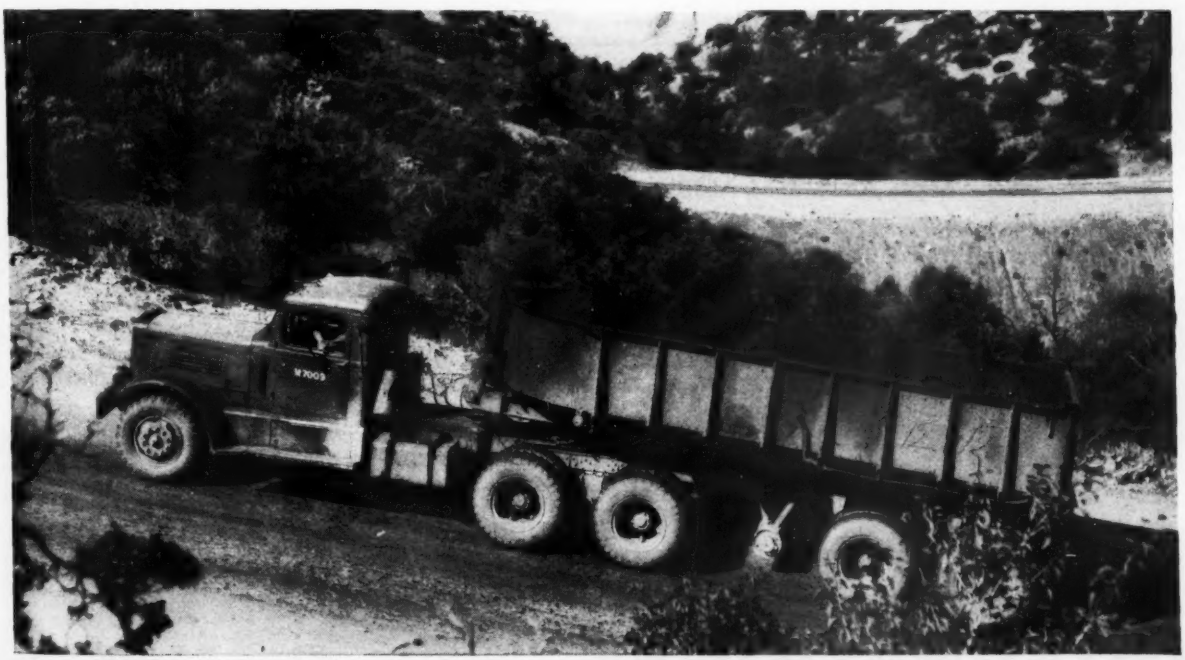
. . . low fuel costs?

. . . minimum maintenance?

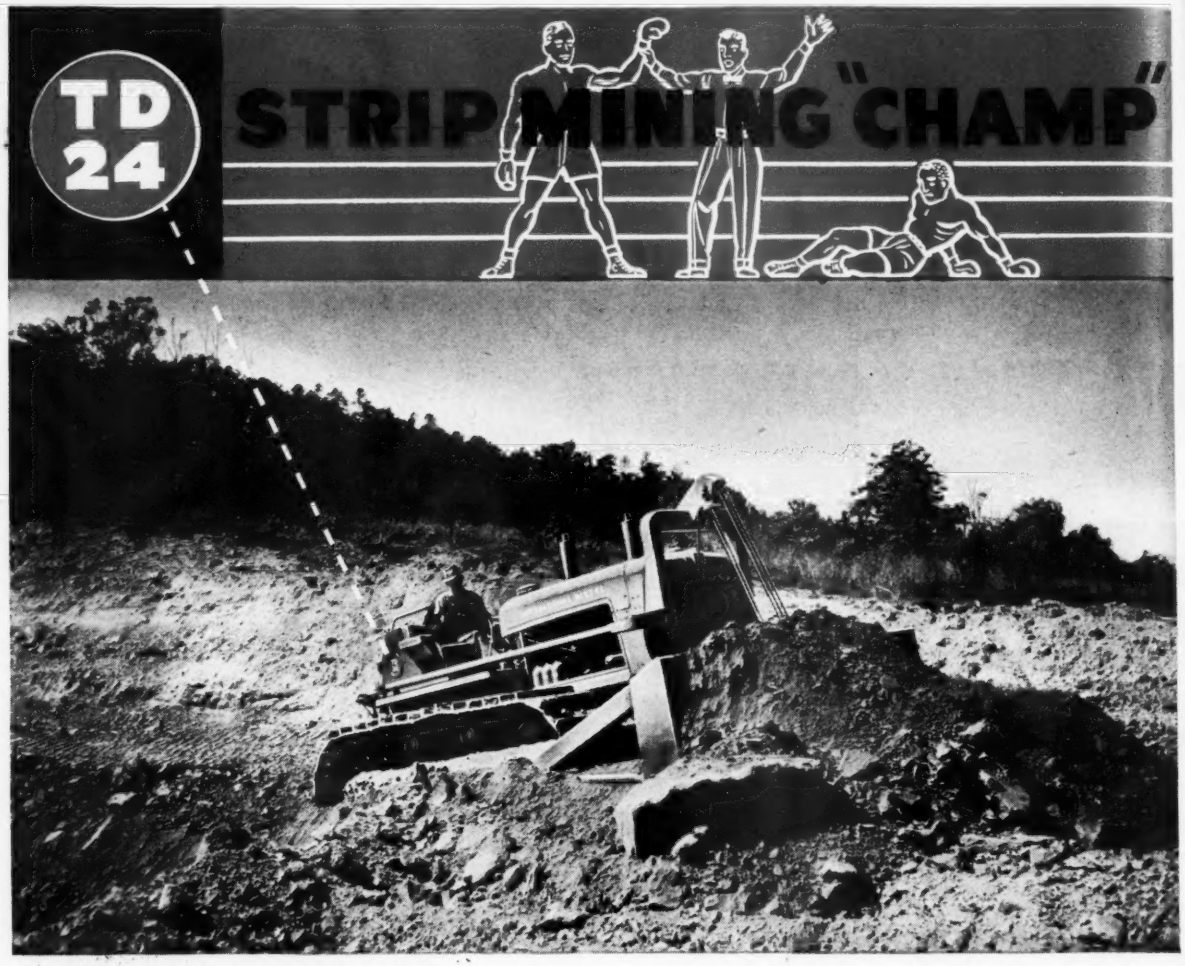
. . . long engine life?

Cummins Diesels have all of these . . .

For example, the 22 Cummins-powered trucks operated by Castle Dome Copper Company, Inc., Miami, Ariz., average 6,500 hours between major overhauls. This firm uses Cummins Diesels in 22 trucks—Autocars, Euclids, and Whites. Cummins-powered Autocar tractors haul 18-ton loads of ore from plant to smelter, making eight round trips a day on a 15-mile haul. In a typical month, 13 Cummins-powered dump trucks moved 565,430 tons of ore and waste, and accumulated 21,214 miles.



CUMMINS ENGINE COMPANY, INC. · COLUMBUS, INDIANA



They don't come any tougher than the International TD-24—and we mean on strip mining jobs.

Here's an example. At Trafford, Alabama, Calvert & Youngblood are stripping 25 feet of overburden from a 24 by 30 foot seam of coal. It's fine coal, too, known as Black Creek. But it lies at a steep angle—unusual for bituminous—and getting that overburden off is an uphill job. Did the TD-24 lick it? Well, here's what owner John Calvert says:

"The TD-24 is a top-notch tractor. We bought it expecting that it would go right to work and give us no trouble. It is doing all we believed it would."

Yes, that TD-24 is 'dozing full blade-loads of dirt up the slope and it's really heaving the overburden off that coal seam. Here's another tough job that the TD-24 knocked over.

Your strip mining problems may be tough but a visit to your International Industrial Power Distributor will show you how they can be licked. Better take a look at the champ —the TD-24.

Industrial Power Division
INTERNATIONAL HARVESTER COMPANY

INTERNATIONAL HARVESTER

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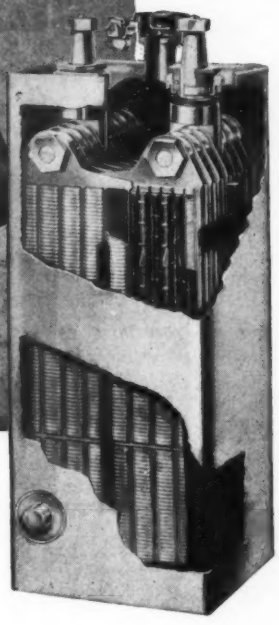
BELOW: cutaway view of typical EDISON cell used in mine haulage batteries.



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WHAT enables an EDISON Battery to stay on the job, out of the repair shop—to see a mine locomotive or shuttle car through its strenuous duty day after day, year after year with maximum dependability? What makes an EDISON Battery give long life and low haulage cost in spite of the hardest usage?

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Case histories show that EDISON Batteries in mine haulage service have fallen down shafts and gone through many wrecks with little or no damage . . . *and still delivered their full service life.* The fact that they can withstand such accidents indicates the extra dependability that can be expected of them under more normal conditions.

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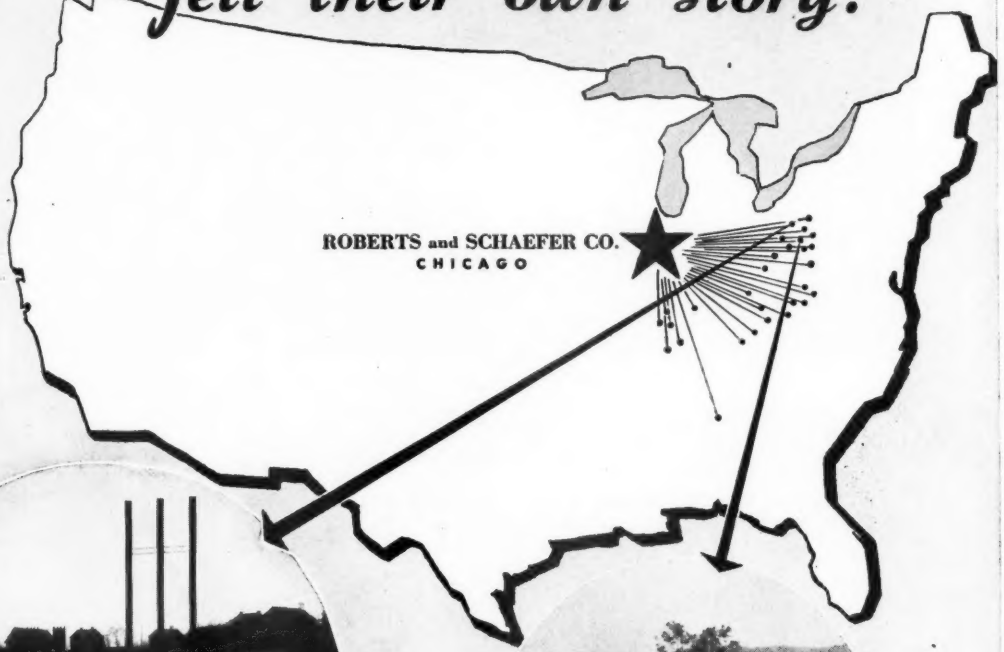

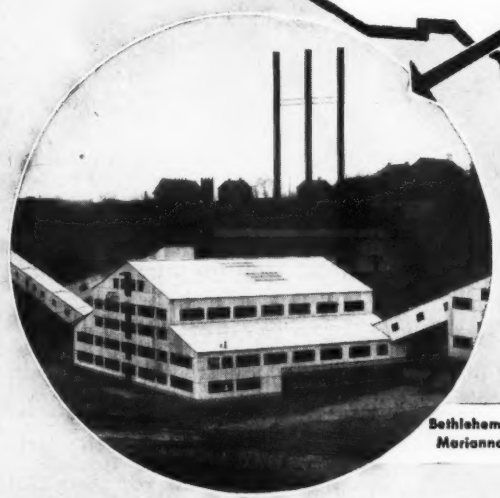

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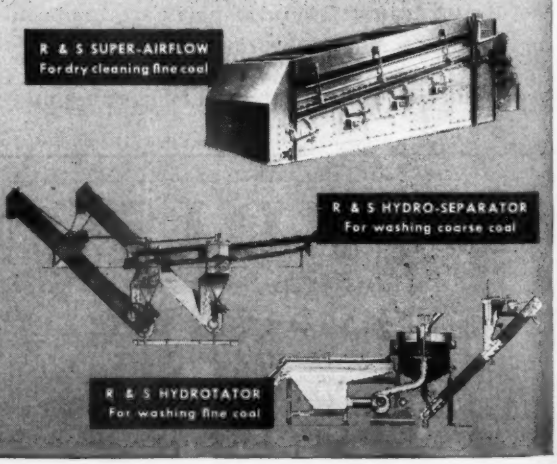
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Editorials

SHELDON P. WIMPFEN, *Editor*

August, 1948

Preparedness Is Relative

IN 1790 George Washington said, "To be prepared for war is one of the most effective means of preserving peace."

Then the problem of preparedness was one of manpower plus an infinitely small amount of war material in comparison with today's vast requirements. The firepower of the foot soldier was usually limited to his muzzle-loading rifle. Tactics demanded that every shot take its toll of the enemies' forces.

In contrast to this practice modern warfare lays down a "field" of fire as a tactical wall through which the enemy cannot pass. Astronomic quantities of materiel are essential for the successful prosecution of modern war. Unlike the condition that held in the days of General Forrest, who held that "to git thar fustest with the mostest" was the way to achieve superiority over the enemy, today's battles are won by those who "git thar fustest with the mostest firepower."

The technological revolution in weapons has steadily diminished the importance of massed manpower. The winners in modern warfare either achieve success or lose it in the big factories and laboratories of the nation. Behind these manufacturing and designing facilities are the mines and mills producing the raw materials of war.

An abundance of a great variety of metals and minerals enabled these United States to become the workhouse of the world during World War II. We supplied enough gear to equip completely six air forces, 2000 infantry divisions, and 558 armored divisions, more divisions than existed in the armies of the world.

If we were required to repeat this performance now or 10 or 20 years hence, the design and character of the equipment required would be vastly different from that used in World War II. The basic principles of war remain unchanged but their application varies constantly. The not-too-distant advent of an age when guided missiles—self-powered, automatically controlled explosive mechanisms—may be the key to warfare, bids us heed the certainty that new and improved weapons will continually be devised.

Total or absolute preparedness for any eventuality is a futile aim. Germany learned this when she found that conquest of Poland, for which she was prepared, led her far deeper than anticipated into the maelstrom of war. A possible result of building up armament to strive for total preparedness, is to be tempted into war. History has shown, in the case of Persia, Rome, France, Germany, Japan, Russia, and others that great military strength was no guarantee against attack nor assurance of victory.

Attempts to attain a close approach to the myth of total preparedness would ultimately exhaust the resources and break the economic backbone of any nation. Not even the totalitarian states that give little or no heed to cost can afford the luxury of complete preparedness in time of peace.

Relative preparedness, measured with a sound yardstick, is the preferred policy to insure success in future emergencies. Its foundation lies in the mental ability of our scientists, planners, and producers. Our natural resources are the building blocks. They must be ready to be laid up in a form to suit the current need at any given time. Once assembled, the structure is difficult to alter. A stockpile of such blocks is being gathered now—albeit at too slow a rate—by a government that has too often disregarded mineral industry problems.

Unfortunately the nature of ore deposits and of operating mines does not permit their discovery nor increased production on demand. Only by stockpiling above ground and blocking out reserves underground can metal and mineral supplies be assured. Dollars, and, more important, time and manpower are stored up in such stocks. They are ever ready for fabrication into up-to-date war equipment, when and if needed.

Of the greatest importance in establishing relative preparedness is the productive ability of the mines, the primary source of most of our stockpiled goods. The stockpile of metals and minerals both in and above ground, of the know-how of recovering them, and of the time and labor involved are preeminent in establishing relative preparedness.

New drift opened with belt and chain conveyors

A Modernization and Expansion Program

Problems of Complete Mechanization Under Varying Seam Heights and Steep Grades Are Being Successfully Solved at the Mines of Imperial Smokeless Coal Company of West Virginia

By C. E. HOUGH
Vice-President and General Manager
Imperial Smokeless Coal Co.

THERE is never any monotony in operating the Sewell seam in southern West Virginia, where "Change is the only constant." The one exception is that the coal maintains its high quality throughout the field and makes mining profitable under difficulties that would be economically prohibitive in a seam of inferior value. In the properties of Imperial Smokeless Coal Company, the Sewell coal runs true to form; heights range from 30 in. to more than 4 ft, the grades run from level to pitches too steep for track or even tractor machines, roof varies from strong top that needs little if any timbering, to slate that requires crossbars. However, all of these conditions are being successfully met as this article will attempt to describe.

Located in the Greenbrier field of southern West Virginia, with headquarters at Quinwood and served by the Chesapeake and Ohio Railway, the properties contain about 10,000 acres leased from the Gauley Coal and Land Co. and the New Gauley Coal Corp. There are three mines: Quinwood Nos. 1, 2 and 3; lying on an axis running somewhat northeast with No. 1 in the southern, No. 2 in the center and No. 3 in the northern portion of the territory. Each operation is entirely separate from the other two and has its own tipple and surface plant.

Although working the same seam and in fairly close proximity to each other—the distance from No. 1 to No. 3 being about 10 miles—mining conditions are quite dissimilar in these three operations. Each one, therefore, uses methods and equipment selected to suit its own conditions and no attempt is made to adopt one standard for the three mines or in fact, for one mine. This is in the interest of efficiency and economy because these properties have sufficient territory and will have sufficient production to justify the installation of whatever equipment is best for its

Modern construction for plant buildings

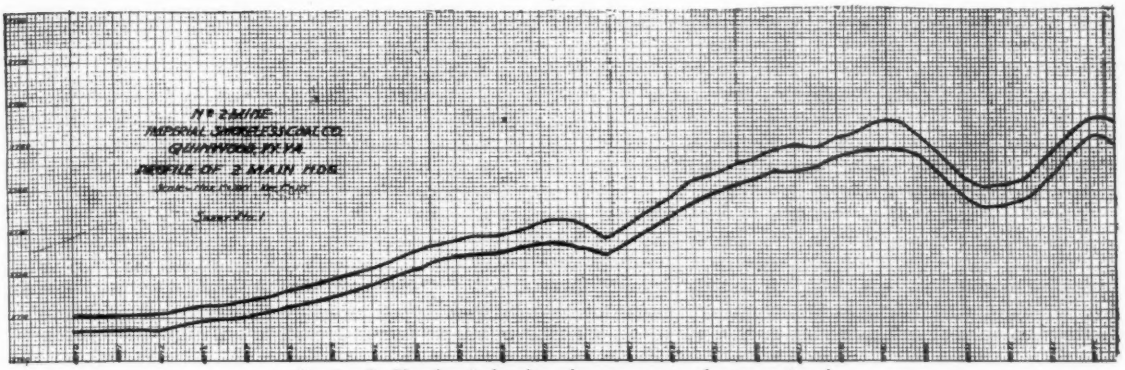


Fig. 1.—Profile of main heading shows severe grades encountered

operation; in other words, each mine is a unit in itself.

Operating Methods and Equipment

Seam variations notwithstanding, a large percentage of this leased area, as proved by prospecting, falls within the limit of profitable operation where the coal lies reasonably level and maintains a fairly uniform height. However, and this is the vital point, even within profitable limits the conditions may change; consequently mining systems are planned and equipment is selected with a view toward being able to meet these changes as they occur. This means that operating methods must necessarily have considerable flexibility. In seam heights of plus 42 in. with good top and fairly level grades, Joy mechanical loaders are used; thinner coal with uniform grades is operated with Goodman duckbills; and, in steep or changing grades hand shoveling onto Jeffrey chain conveyors is the method employed.

A major problem is the haulage. In a few cases it is possible to use mine cars at the face with locomotive gathering, but this is the exception and as a rule, the pitches are, or are certainly apt to be, too steep for economical track operation. The cost of grading the gathering roads would of course be prohibitive so three types of transportation equipment have been adopted; chain conveyors for service haulage in the rooms, belts for gathering on the room entries, and mine cars on the main line. This combination successfully meets our conditions; steep pitches in rooms and panel entries can be operated with conveyors and on the main line, by taking top or bottom, it is possible to establish track grades within the economic limit of locomotive transportation. Fig. 1, showing a profile taken over a section of the main haulage road in No. 2 mine, illustrates a condition which is not general throughout the property but is nevertheless often encountered.

Track is constructed according to the best modern specifications with 70-lb rail laid on treated wood ties. The trolley wire is No. 9 section, and in addition a 500,000 cir mils feeder line insures adequate power to the working panels. Returns are through the rails which are bonded and cross bonded. The track is well ballasted, laid to correct alignment and in every respect is built for a long life of high tonnage service. Top or bottom is taken as needed to secure a fairly uniform grade and a height of 5 ft above the rail is maintained. Where top is shot above the seam, the roof is fairly good and only occasional crossbars are needed. The present haulage units are two 8-ton locomotives in tandem but as soon as possible, two 13-ton locomotives will be transferred from No. 1 mine.

A combination of mechanical loading and conveyors presents some difficulties in the way of providing conveyor capacity to handle the peaks of machine tonnage. This has been overcome by a chain conveyor of special design, built by the Jeffrey Manufacturing Company—15 in. wide, with a capacity of 3 tons per minute. The belt conveyors are 36 in. wide, operating at 250 fpm; the usual underground type with frames, terminals, drives, etc., furnished by Goodman Mfg. Co. and Jeffrey Mfg. Co. All conveyors are controlled at the loading point, with starting in sequence; provision is made, however, for operating any single unit when desired, as for example when reversing to take supplies to the working faces. The supplies are brought by mine cars from the outside to the discharge end of the gathering belt conveyor and from there are taken into the working faces by the conveyors running in reverse. A 5 hp Brown-Fayro portable hoist is used in each panel for handling heavy supplies and for moving the conveyor drive sections but a mobile unit is now being constructed at our shop by mounting a hoist on an old loading machine catterpillar base.

Power is taken to the face machines by a three-conductor cable—positive, negative, and ground wire. This is made in 125-ft sections to eliminate the use of a reel and the sections are joined to each other by a fire-hose type cable connector. At the face there is a circuit breaker type distribution box through which power is furnished to the face machines; this box insures proper connections at all times and safety to the crews. Each belt unit has sectionalized circuit-breakers also.

Outcrop Mining

A special feature incorporated in planning is outcrop stripping. The property, with its miles of hillside crop, contains thousands of tons of coal which can be recovered economically by stripping and this type of mining is employed extensively. It is a method particularly adaptable to the hilly terrain of the Appalachian region where it is coming into wide use, having the advantage of recovering large tonnages of outcrop coal with light cover that prevents mining underground. In addition to recovering the coal, the exposed crop in the highwall provides locations for easy entrance into the seam for deep mining, and further provides a solid roadbed where an outside main line haulage can be built to railroad specifications. The only cost is for laying the track; the roadbed costs nothing; in fact, the coal from the outcrop stripping has already yielded a profit. On all properties every opportunity is being taken to bring main lines to daylight with the consequent economies in construction, operation, and maintenance of the locomotive haulage.

Outcrop stripping offers a valuable by-product in making possible the establishment of portals convenient to working sections. The property is traversed by State Route No. 20—a hard-surfaced highway, a portion of which is in close proximity to the outcrop. From this highway branch roads can be built at reasonable expense to reach portal openings that will be established as the mine develops. This situation is indicated on the map of No. 2 mine.

Description of the Mines

There are three mining operations each with its own tipple and surface plant; No. 1 is practically worked out, No. 2, opened in 1943, is in production with a long life ahead, while No. 3 is in the development stage. The foregoing paragraphs of this article apply generally to all three operations, but each mine has certain individualities both in the projection and in the method of working. It should expressly be stated that in selecting methods and equipment, decisions are based on experience—without experimenting or pioneering—but simply mining coal at a profit under some difficult conditions.

No. 1 Mine Has Good Top

This is the oldest mine of the company and its territory is practically worked out; only barrier pillars remain. However, seam conditions here are better than the average in this field—the coal is usually over 42 in. high, the grades are fairly level, and the top stands well. This statement applies only to the barrier pillars where mining is now going on, as in the remainder of the property, worked out some years ago, the characteristic seam height variations and grade changes were encountered.

Main heading barriers are being recovered, but a map of the workings is not shown in this article as the operation can easily be explained. When the mine was originally developed the conventional system was followed; entries were driven to the right and left off the mains at 300-ft intervals and rooms were started 125 ft from the mains. The rooms have since all been worked out and what coal remains is in the barrier pillars, each 125 ft wide by 300 ft deep; the 300 ft dimensions being parallel to the mains.

The pillars are recovered with mechanical loading directly into mine cars. Three splits are driven in a pillar, starting off the old room entry and driving up parallel to the mains; the splits are from 30 to 35 ft wide, which leaves a thin pillar between about 10 ft thick. This is not recovered. The original mining in the rooms must have been fairly complete; at any rate, the roof over the old workings seems to have caved and there is no evidence of weight in the barrier pillar recovery. Under the dimensions just described, approximately 80 per cent of the coal is extracted.

A unit operation has one Joy loader and one Jeffrey track-mounted universal cutter with the mine cars of 4.25-tons capacity served to the loader by a 6-ton gathering locomotive. The three places in a pillar constitute a working panel and all operations—cutting, drilling, loading, etc.—are carried on in rotation. There are two operating units in this mine, each working as just described and with similar equipment. Each unit at present is producing about 250 tons per shift, making the total output of the mine approximately 1000 tons per double shift day. This mine is nearing completion and at the present rate of production will be worked out and closed down in approximately one year's time.

The surface plant is of course modest, consisting only of a tipple and a repair shop, which also houses a substation with a 200-kw rotary converter. At this shop, some of the underground equipment now being released is being rehabilitated for transfer to the other mines, and the building of prefabricated steel construction with aluminum sheet siding and roofing will also be moved to another location as soon as its work here is finished.

No. 2 Mine Largest Producer

This operation, is the largest producer and its territory on the whole has fairly favorable conditions. The seam height varies from 36 to 48 in. with an average of around 42 in. There is a slate parting near the bottom but with 3 ft of coal above it, so in case the slate reaches unusual thickness, it will be possible to cut on top of it and mine the 3 ft section of the seam above. The operating method here is determined by the seam height; when this permits, the coal is loaded by tractor machines, discharging into the specially-designed chain conveyors previously described; in thinner coal, duckbills with shaker conveyors replace the mobile units and where conditions become severe, hand shovelers onto chain conveyors are used. In each type of operation, the room conveyors load onto a gathering belt in the entry, which in turn transports the coal to the main line track and mine car haulage.

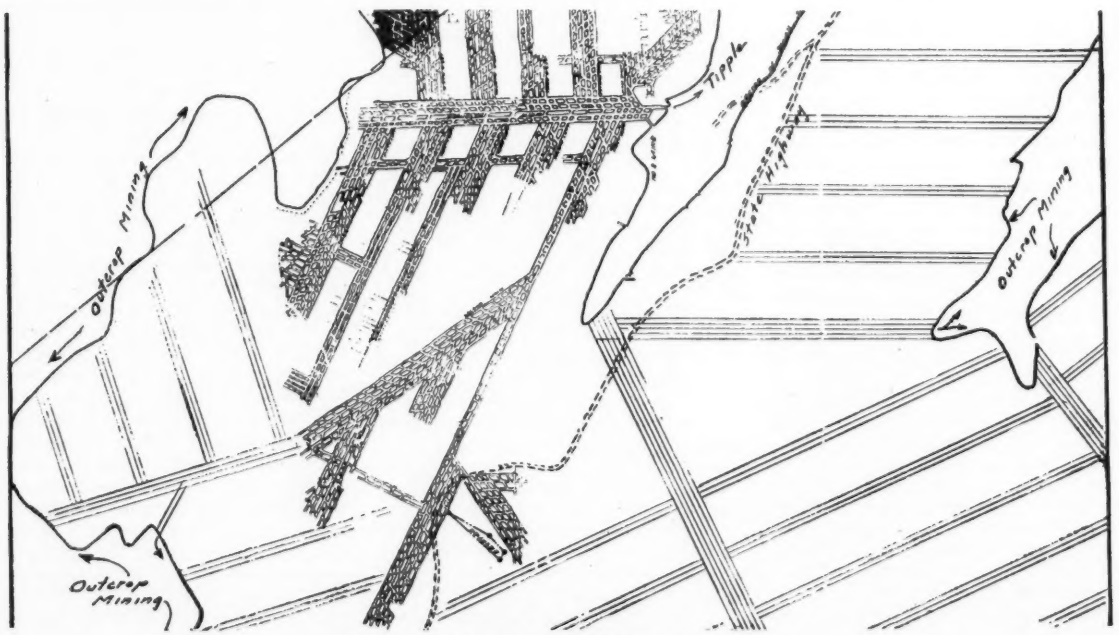


Fig. 2.—No. 2 Mine is projected for outcrop mining

Where mechanical loading is used, the cutting is by a track-mounted universal, but where hand shoveling is used, the cutting machine is with a shortwall which stays at the working face. This is equipped with a bug-duster. In this mine, the rooms are worked on a rotating cycle; that is to say, the preparation crew works in one room while the loading crew works in another, each group following the other in rotation, making as many cleanups as possible during the shift. In organizing the crews and in selecting the equipment, an attempt is made to keep plans entirely flexible and what has just been outlined describes some different types of setups used.

As previously mentioned, outcrop mining is an integral part of operations in this field, and the map in Fig. 2 with the projection of No. 2 Mine shows how this feature has been incorporated into the plan. It will be seen that most of the underground main haulages serve as connectors or tunnels from one outcrop section to another. By this method it is possible to work a large territory from one surface plant and without excessive haulage costs. The area of No. 2 Mine, all of which is not shown in Fig. 2, is roughly 3 miles square, containing about 15,000,000 tons of Sewell coal within the outcrop lines. To transport this tonnage over the distance involved to one cleaning plant would require a rather elaborate underground haulage system that would be costly to maintain and operate. Outside haulways however can be constructed cheaply and operated with large capacity equipment that will bring the haulage cost to a reasonable figure.

Developing No. 3 Mine

This mine, working in the northern end of the lease, is in the development stage. Here the conditions are somewhat severe; the coal is lower than the average of the property, ranging from 30 to 42 in., the grades are steep and the top is not good. The seam, however, has only one small parting, which occurs in the middle of the seam over a small area of the property. Because of the low height and also because the top frequently requires crossbars, it was felt that such conditions would not permit economical operation of mechanical loading; consequently, the system used here is hand shoveling onto chain conveyors.

The plan which is now going into operation is to work four rooms on an entry as a unit. These may be driven simultaneously to the right and left or else may work all on one side, advancing on the left as the panel entries are driven and retreating on the right after the left side has been worked out. The rooms will operate on a continuous cycle—that is, one crew with complete equipment will remain in a room performing all operations and completing as many cuts as possible during a shift.

Low-type steel cars at No. 3 Mine run on single track in main heading

The map in Fig. 3 shows the general plan of development with the first panel now on production. It is contemplated to have four panels operating, three on production and one on development, and under this arrangement, it is estimated that the output from this area will be 750 tons per shift, or 1500 tons per day on double shift.

The haulage here follows the standard plan, chain conveyors from the working faces, to gathering belt conveyor, to mine cars for main-line haulage. This arrangement is shown in Fig. 3. It will be noted that the main heading has single track but the left mains will have double track, laid in one entry if the roof permits, otherwise in two parallel entries. This double-track system provides both the haulage-road and side tracks at the discharge points of the belt conveyors where it is essential, with four entries operating, to have track and haulage facilities that will allow all belts to load mine cars simultaneously without conflict. Crossovers will be installed so that empties may be placed at each belt discharge and loads taken away without stopping or interfering with the conveyor operation.

Conclusion

The foregoing descriptions to some degree look slightly ahead in that, beside covering operations now under way, they also include some operations in their early stages. However, by following proven procedure based on a knowledge of the Sewell Seam in this field plans are flexible to allow for changes that may be called for by future conditions. The modernization program has been in effect for less than a year; so far it has proceeded on schedule. The cooperation of staff and employes has been a real contributing factor toward the progress made.

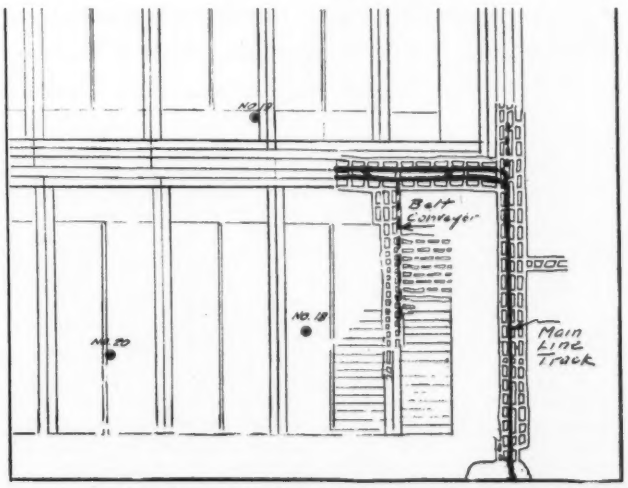
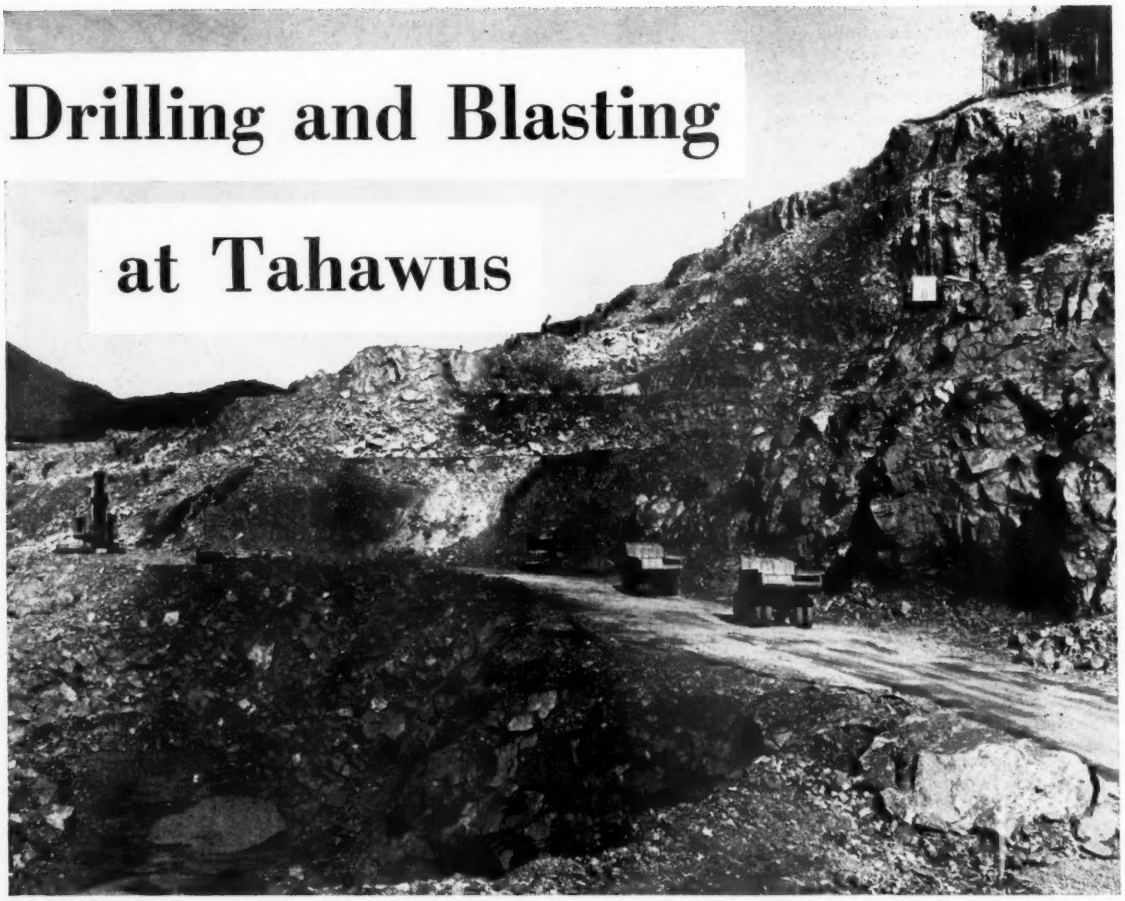


Fig. 3.—No. 3 Mine is developed for combination conveyor and mine car haulage

Drilling and Blasting at Tahawus



Electric shovels load 15-ton end dump trucks at Tahawus. Note churn drill at upper right. Diamond drilling determines footwall limits

Opened in 1941 as a Source of Ilmenite, This Sharply-Dipping, Elliptical-Shaped Orebody, Partially Covered with Overburden, Presented Many Breaking Problems. Here Two Men, Largely Responsible for Their Effective Solution, Explain How a Successful Method Was Developed and Details of Its Operation.

★

C. R. BEGOR
Mine Superintendent
and
C. A. QUAM
Assistant Mine Superintendent
MacIntyre Development
National Lead Co.

★

SEVEN years ago the MacIntyre Development of the National Lead Co. at Tahawus, N. Y., was brought into operation, when world conditions threatened to cut off the supply of ilmenite to this country. The operation has developed into the world's largest ilmenite producer.

The orebody mined outcrops on the side of Sanford Hill, overlooking Sanford Lake, in the heart of the Adirondack Mountains. As there were no residential areas of any size within communicating distance, labor and housing has been a constant problem. To overcome this situation, the National Lead Co. built the village of Tahawus, which at present has a population of approximately 1000 persons. For the convenience of the employes, a complete village, including many homes, a general store, restaurant, boarding house, and YMCA, has been constructed.

The Deposit

Lenticular-shaped veins of closely associated magnetite and ilmenite separated by gabbroic and anorthositic waste zones and inclusions make up the ore body. The length of the deposit is approximately 1800 ft, with a maximum width of 900 ft, conferring an elliptical shape to the mine workings. The lenses have a dip varying between 45 and 80 deg towards the west.

Original Mine Development

Unlike many quarry operations, the benches are maintained at only 35 ft heights. Due to the scarcity of labor and especially skilled mine labor at the outset of operations, it was deemed advisable to keep the benches of such a height that it would be possible to scale the working faces with the power shovels during loading operations. This eliminated consid-

erable skilled labor for scaling, which would have been required if higher faces had been maintained.

Removal of the overburden, by means of a power shovel and trucks, was started as soon as the trees and brush had been cleared from sufficient area. The overburden varied in depth from practically nothing at the top of the hill to 25 ft at the lower level. Excavation for the first bench was started at the level of the dumping station at the primary crusher. The first line of holes across each bench was drilled at the standard bench elevations by means of drifters mounted on tripods. This provided sufficient working space for a small power shovel.

The bench and face obtained were of sufficient width and height to permit successive cuts to be made with wagon drills. When the desired height of face was attained, the wagon drills were replaced by churn drills. The mine haulage road and bench approaches were driven on a maximum grade of eight per cent.

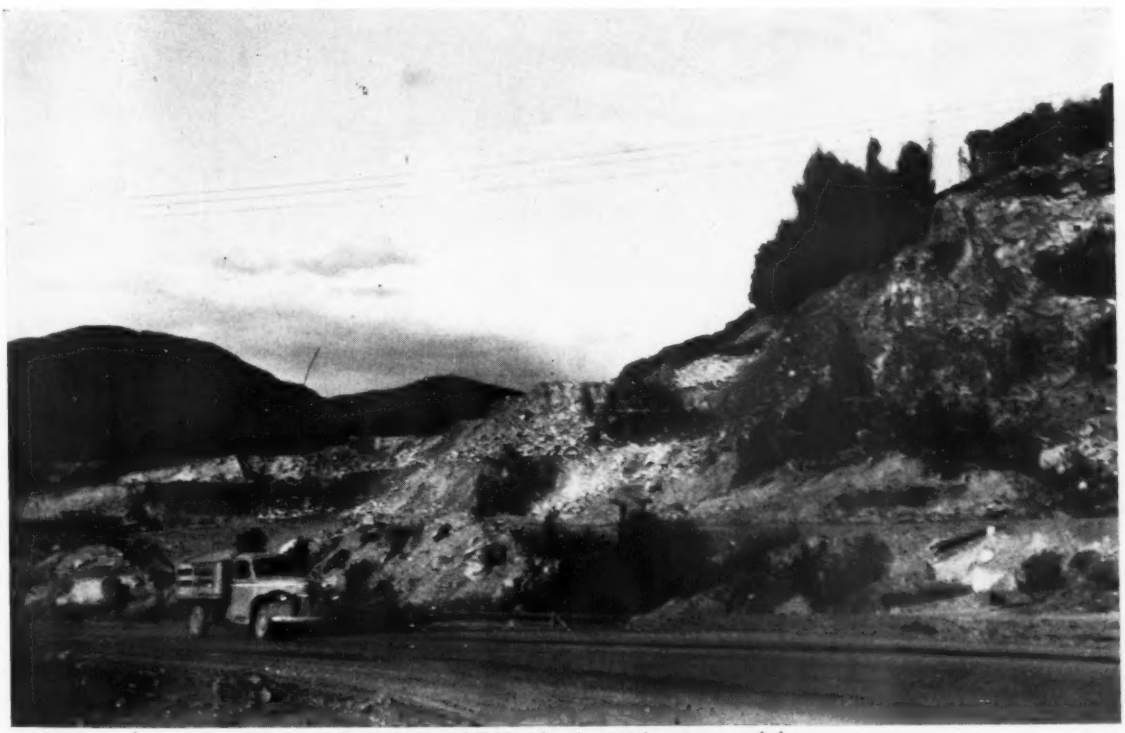
Churn drills prepare holes for advancing bench while broken muck is loaded

History of Churn Drilling Practice

Bucyrus-Erie, 29-T churn drills, track mounted and powered by 440-v electric motors, were utilized for blast-hole drilling. For protection to the operators during adverse weather conditions, the drills are equipped with an insulated, electrically-heated cab.

In the early operation, 6⅝-in., churn-drill bits were used with a 5-in. drill stem. Difficulties in drilling and blasting were encountered from the start. Drilling speeds and bit life were considerably below what had been expected. Blasting results were also poor.

In wagon drilling the holes had been placed fairly close together and a satisfactory breakage of muck had been obtained with a 60 per cent straight Gelatin dynamite. When this dynamite was used in churn-drill holes the results were far from satisfactory. The muck broke big and considerable toe was left. In some cases the shots did not pull at all. As the drilling speed was low, it was decided to try stronger dynamite rather than to space the holes much closer. After considerable experimenting, it was found that by using a 90 per cent straight gelatin dynamite a fair breakage could be obtained with holes



Typical churn-drill blast breaks 1600 long tons per hole

spaced 15 ft apart, with a 16-ft burden and bottomed 6 ft below grade.

With the churn drills on hand sufficient muck could not be broken to keep up the mill production and still provide removal of included waste. Because of a critical labor, housing, and material shortage, it was not feasible at the time to increase drilling capacity by the purchase of additional churn drills. A test was conducted using a 7-in. drill stem with a 9-in. bit in place of the smaller diameter stem and bit. The heavier string of tools compensated for the larger area of the 9-in. hole and the drilling speed remained nearly constant. In broken and seamy ground, the heavier, larger-diameter string of tools was a distinct advantage. A spacing of 16 ft, with an 18-ft burden and holes bottomed 4 ft below grade, was permissable with the 9-in. bits. This gives an average of 1600 long tons broken per hole. As waste does not have to pass through the crusher, and fine breakage is not essential, a 20 by 20-ft spacing is used in drilling large waste blocks. All the churn drilling was changed to the larger-sized bits and stems as soon as they could be procured.

Because of the numerous joint planes and the necessity of confining the dynamite to the bottom of the hole, the area below the bench floor becomes quite shattered. This causes considerable caving of the holes, requiring casing in the upper sections of some of the holes. The more prominent joint planes have a dip of 80 to 85 deg. When these are encountered in drilling, considerable effective drilling time is lost because of the tendency of the drilling tools to follow the cracks. Reaming becomes necessary and sticking of bits is a common occurrence.

When there is sufficient width of waste on any bench to prevent mixing with ore, a double line of holes is drilled. The holes in the back line are offset from those in the front line. A spacing of 20 ft between holes in each line and between the front and back line is practiced. Less secondary blasting is required and the drilling of the back row is simplified as it is beyond any backbreak caused by the previous blast. As is to be expected with double-row blasting, there is more backbreak, but this is not confined to the top of the hole. The face is usually left in the same condition as when single-row blasting is used, with the added advantage of better breakage and slightly increased tonnage per hole.

Two 42-T, Bucyrus-Erie churn drills were purchased shortly after the close of World War II, but due to a backlog of orders the drills were not delivered until January, 1948. These drills use the same drill bit as the 29-T drills; however, a 30 ft by 7-in. diameter drill stem is utilized to give a 50 per cent heavier string of tools. Difficulty was encountered as soon as the drills were put into operation. The pins on the bits began to shear off flush with the bottom of the stem. It became evident that the diameter of the bit pins would have to be increased if satisfactory drilling results were to be obtained. The bit pins and stem boxes for these two drills were changed from 3¼ by 4¼ in. to 4 by 5 in. As there have been no pin failures since the change was made, plans are being carried out to standardize on 4 by 5-in. pins on all the 29-T drills when the present stock of bits is depleted.

The mechanically-operated tool wrench and hydraulic-leveling jacks of the 42-T drills increase their effective drilling time considerably above that of the 29-T drills. As the average footage drilled by each bit is only 4.5 ft, between 10 and 20 per cent of each shift is utilized in changing bits with the hand-operated table tool wrench of the 29-T drills. From the results obtained up to the present time, it is anticipated that a 50 per cent increase in drilling speed can be maintained in both ore and waste with the larger drills. This will give an average of

Aerial view of mine and mill. Causeway will divide lake to form tailing pond. Cone-shaped pile is nonmagnetic waste. Left of cone is four-story crushing plant. Milling plant lies behind cone and sinter plant is at extreme right

3 ft per hour as compared to 2 ft per hour averaged by the 29-T drills. Maintenance costs on the 42-T drills should be less per foot of hole drilled because they are of more rugged construction and the hydraulic leveling jacks hold the machine more rigid.

In an effort to obtain more uniformity in bit-hardening operations, an Ajax-Hultgren salt bath heat treating furnace has been purchased and will be installed in the near future. It is estimated that an increased bit footage of 50 to 100 per cent can be achieved with this furnace over the present oil-fired, heat-treating furnace.

Churn-drill Hole Blasting Procedures

As the working areas in the mine are all within a small area, it is important that blasting procedures be conducted as safely as possible. Because of this no blasting caps are placed in the churn drill holes. Primacord is used to propagate all the dynamite used in the blast holes. The blasting caps are not attached to the primacord until just prior to firing. Whenever it is desired to give delayed blasting to the holes, as in double-line blasting, separate trunk lines of primacord are run for each delay desired. The delays are achieved by using short-period-delay electric blasting caps fastened to the end of the trunk lines.

Holes are loaded with an average of nine 50-lb sticks of dynamite. The dynamite is 8 in. in diameter and is soft and pliable with a loose wrapper. This permits a certain amount of tamping of each stick by the one following. An 8 by 21 in. stick usually occupies only 18 in. of hole. This permits the whole charge to be confined to the bottom 14 or 15 ft of hole. The charge is stemmed with 5 ft of mill tailings. In the earlier blasting the holes were filled to the top with stemming and tests were conducted with deck-loaded charges. In both cases there was considerable backbreak at the top of the bench. This produced an undesirable drilling condition. The surface of the bench was badly shattered and the burden in front of the bottom of the next line of holes was too great, resulting in poor breakage and considerable toe that had to be drilled with wagon drills.

By placing the entire charge in the bottom and reducing the amount of stemming in the holes, it was found that there was a much better tendency to shear along the line of holes giving less backbreak at the top and leaving the bench in better shape for future drilling. This blasting brings out the toe and leaves the bottom of the muck pile well shattered, a desirable condition for shovel loading.

The difficulty in obtaining satisfactory breakage of the ore may be attributed to two principle factors; namely, the blocky nature and hardness of the formation, which tends to relieve the blast pressure along fissures and joints, and more important, the weight of the ore. The high grade ore weighs 8 cu ft per long ton. This is much heavier than the average ores mined by open-pit methods.

Secondary Blasting

As the ore is fed to a 48 by 60-in. jaw crusher, it is desirable to have the maximum size of any ore loaded not more than 36 in. Blocks above this size are set aside by the shovels for secondary breaking. During the earlier operation these blocks were drilled with jackhammers and blasted. This required considerable manpower, portable compressors, piping, and drilling equipment. As there was an acute manpower shortage at the time, experiments were conducted using 40 per cent Hi-Velocity dynamite for mud capping. The shock from this type of blasting was not a problem as there are no cities, villages, or farms in the vicinity, with the exception of the company-built village of Tahawus. This proved to be a satisfactory method of breaking large chunks of ore and as eight men were relieved to fill other mine jobs, the increased dynamite consumption was not prohibitive. Three tons of ore and waste are broken for each pound of dynamite used in primary and secondary blasting combined.

Loading and Hauling Equipment

The mine loading equipment consists of two Buryrus-Erie, 85-B electric shovels, one Northwest, 80-D Diesel shovel all of 2½-yd capacity, and one P&H, 1400 electric 4-yd shovel. The P&H shovel, together with three, 22-ton, Euclid, Diesel-powered trucks, is used primarily for waste loading. The other haulage equipment consists of 14, Diesel-powered, Euclid end-dump trucks of 15-ton capacity. Three Caterpillar, D7 tractors, one Caterpillar, D8 tractor, and a motor grader are used to maintain the roads and haulage ways and to level the loading areas around the shovels.

An average production of 90 long tons per man shift is being maintained at the present time.

Mine Pumping

As the mining progressed it became necessary to develop below the level of the surrounding area. This necessitated pumping surface water and a small amount of ground water. Due to the close proximity of the working areas to the sump, an installation was needed which could be readily removed and reinstalled to permit blasting. A pump that was self-priming and automatic in operation was desired because the inflow of water fluctuates greatly as the majority of the inflow is surface water from rain or melting snow. Two Byron-Jackson-deep-well pumps were secured for this purpose. One of the pumps is utilized as a standby in case of emergency as under normal conditions one pump has sufficient capacity. The pumps are mounted on skids and are suspended from an A-frame by wire rope connected to a hand operated winch. The pump can be readily raised when it is necessary to pull the unit out for blasting. It is necessary to remove only one Victaulic clamp on the discharge pipe and pull an electric plug before the pump is ready to be moved. The pump motor is started and stopped by means of a float switch. One pump is housed and heated with an electric heater to prevent freezing during the winter months.

Stripping Procedure

Some stripping of waste outside the orebody has been contracted to Winston Brothers Construction Co., Minneapolis, Minn. As it was impossible to obtain churn drills at the time they started work, they employed wagon drills. The 35-ft benches which had been established, were divided in half allowing lower faces for more satisfactory drilling and breakage with wagon-drill holes. As the winters are long and cold, it was necessary to heat the water and pump it to the drill locations to prevent pipe lines and drills from freezing. Tests are being conducted using bits with tungsten-carbide inserts on the wagon drills. These appear to be more effective when water is not used in drilling and may eventually solve many of the problems encountered in drilling in cold climates.

Wagon-drill holes are sprung two or three times to allow heavier loading at the bottom of the holes. The holes are loaded with 1⅛ by 12-in. straight gelatin dynamite of 75 per cent strength and detonated with electric-delay blasting caps. This method of drilling and blasting produces larger chunks than churn drilling and requires considerable secondary blasting.

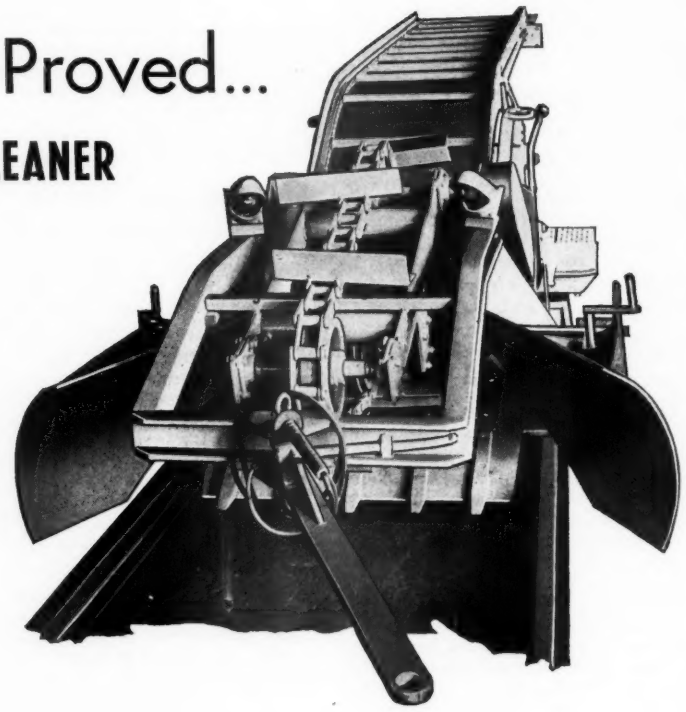
Experimental drilling is being conducted with an Ingersoll-Rand, Quarry-Master, piston-type pneumatic drill. This machine drills a hole 5 in. in diameter. No water is used in drilling as the cuttings are blown out of the hole and collected by a dust collector. Experiments are also being conducted with tungsten-carbide bits on this drill.

The authors wish to thank the National Lead Co. for permission to publish this article and to thank Frank R. Milliken, plant manager, for his constructive criticism.

Performance Proved...

THE CANTON TRACK CLEANER LOADS

one dirt ton per minute!



A road hog that roots up the hard dirt between rails and loose gob beyond rails, and loads it in cars. Rigidly built to meet the demands for a heavy duty machine, DIGGER PLATE can be raised or lowered with a hydraulic pump, WINGS are adjusted, up or down, in or out, independent of each other. FRONT CONVEYOR is of floating type, permitting large rock to be handled. BOOM built to accommodate car size. BOOM CONVEYOR can be raised or lowered. MACHINERY protected with a shear pin. Quickly changed. Standard WINGS clean 48 inches from center of track gauge. Extensions to WINGS permit cleaning greater distance. Pulled by a locomotive. Length 21 ft. width to conform to haulway. Weight 4500 lbs.

Capacity—one ton dirt per minute. Does the dirty work without complaint. Send for bulletin.

The machine is now making history in economical cost mining because a machine will now keep floors cleaned and safe, taking the place of track cleaning crews, who have always resented doing this class of work.

Performance Records

893 three-ton cars, on time and one-half were loaded with machine at a cost of $.462 per ton;

Hand loading (estimating five 3-ton cars per man per shift) would cost $1.31 per ton;

Total cost at $19.575 per shift for 893 cars with machine..... $1,257.32

Same number of cars, hand loading, would cost $3,509.49

Would the saving of $2,252.17 have any effect on your

COST PER TON OF COAL?

Another company loaded 887 tons at a cost of $.465 per ton, cleaning 27,860 ft. of track at $.015 per foot. (Names on request.)

In writing, please use street and zone number.

THE AMERICAN MINE DOOR CO. 2063 DUEBER AVE., CANTON 6, OHIO

An all-conveyor gathering haulage system

By FRED R. TOOTHMAN

Mining Engineer
Chesapeake & Ohio Railway

Developments in Conveyor Mining

To Meet Local Conditions, a Variety of Machinery Types Are Employed to Produce Large Tonnages of Conveyor-Mined Coal

A mobile tractor loader with room conveyor

WEST VIRGINIA, the State that produces the most bituminous coal, supplied a total of 173,653,816 tons in 1947, an all-time record. Almost 90 per cent or 154,119,700 tons came from so-called "commercial" mines, or those underground mines employing more than 10 men. Of this total commercial production, 26,000,000 tons or 17 per cent was produced by the use of conveyors at the working face.

This record production came after the year 1946 during which coal production had declined to a point less than that of any year since the beginning of the war in 1941. The year 1946 was also unique in the fact that loader tonnage declined for the first time since the beginning of the present era of mechanization in coal, generally recognized as beginning about 1936. During 1946 conveyor-loaded tonnage increased for the first time since 1942 by attaining a new high of 21,000,000 tons. Consequently 1946 was a significant year for the conveyor method of mining coal, not only from the standpoint of production but also as a year in which conveyors were becoming established for gathering coal with mechanical loaders.

Although both conveyor and machine-loaded tonnage increased with the record production in 1947, the latter made the greater gain. Any effort to explain these trends would have to consider the effects of the lifting of production controls at the end of the war and all other relative influences. Conveyor tonages include only that coal produced by hand-loading onto conveyors and duckbills and does not include the tonnage loaded by mechanical loaders directly into chain conveyors or belts. Previous to the year 1945, machine-loaded tonnages had made consistent gains every year; however, during 1945 and 1946 the rate of annual increase was somewhat lowered.

The combined percentage of machine-loaded and conveyor production in the state made an annual gain of nearly seven per cent from 1936 to 1941. Due to a falling off of the conveyor component thereafter, the rate of increase continued at about four per cent per year and has persisted to the present time. At the end of 1947 almost two-thirds of the commercial tonnage was produced by mechanical-mining methods. If the present trend continues hand-loading will be eliminated in about nine years, although such a possibility does not seem feasible at the present time.

The first decrease in the number of conveyor units reported by mines in the state appeared in 1947. More than 200 units less were reported than for 1946. No corresponding decline was reported for loading machines. Such a substantial reduction

Presented before West Virginia Mining Institute at Beckley, W. Va.

COAL PRODUCTION IN WEST VIRGINIA BY LOADING MACHINES AND CONVEYORS

Year	Coal Production	Conveyor Production	Mechanical Loaded Production	Per cent Conveyor Loaded	Per cent Mechanical Loaded	Total Per cent	No. Loaders	No. Conveyors	No. 100% Conveyor Mines
1936.....	118,134,202	2,360,897	6,333,396	2.0	5.4	7.4	125	197	4
1937.....	118,965,066	3,993,453	11,497,410	3.4	9.7	13.1	183	301	11
1938.....	93,511,099	6,189,771	14,170,248	6.6	15.2	21.8	272	579	14
1939.....	108,515,665	10,107,681	21,213,634	9.3	19.5	28.8	327	719	24
1940.....	126,619,825	14,895,718	30,249,989	11.8	23.9	35.7	414	811	24
1941.....	140,944,741	19,023,806	40,104,537	13.5	28.5	42.0	532	928	34
	*140,079,430								
1942.....	156,752,598	21,278,579	48,016,373	13.9	31.3	45.2	600	1,109	35
	*153,542,264								
1943.....	160,429,576	20,379,149	54,410,997	13.2	35.4	48.6	637	1,141	32
	*153,861,108								
1944.....	164,954,218	19,681,353	59,561,637	12.9	39.2	52.1	840	1,314	36
	*151,998,096								
1945.....	151,909,714	18,493,415	60,772,540	13.4	43.9	57.3	862	1,589	38
	*138,330,872								
1946.....	143,977,874	20,832,282	57,067,992	16.1	44.2	60.3	968	1,774	47
	*129,340,950								
1947.....	173,653,816	26,362,696	73,818,217	17.1	47.9	65.0	1,168	1,525	55
	*154,119,700								

* Commercial Mines, West Virginia Department of Mines Reports. 1947 Figures are tentative.

in conveyor equipment will probably be reflected in the production statistics for 1948 and indicates at least a temporary lag in enthusiasm for this type of mining.

During the past two or three years, the practice of using tractor-mounted loading machines discharging directly into chain conveyors has been widely adopted. Although adaptable to either entry or room mining this method in general has been more effective in rooms where the greater width allows more space to maneuver the machine. Chain conveyors are being used almost exclusively behind this machine. Only two faces are kept active by one machine and the inability of preparation to keep ahead of loading has been a problem. It has been found desirable to use two cutting machines, one in each place, to minimize delays in preparation. Where favorable natural conditions prevail production has been increased 25 to 50 per cent over hand-loading with similar conveyor setups.

The so-called "powered-duckbill" is a relatively new development in conveyor mining equipment and is an improved version of the standard duck-bill. As the name infers both the forward and lateral movements of the head are power driven. Better control and faster action at the loading head is now possible with the improved type.

An innovation in mechanical loading is now in use at several West Virginia mines. This machine has been called the "conveyor-loader." It is mounted on four small rubber-tired wheels and is designed to load into a chain conveyor at the face. It is unique in the fact that the discharge end is attached directly onto the gathering conveyor and the front wheels can be turned to allow lateral movement of the loading head across the face. The loading head can also be extended or retracted to facilitate loading the loose coal at the face without shifting the machine.

As yet no solution has been found for the conveyor operator's persistent problem of moving the equipment and transporting supplies, although some strides have been made toward a new approach. A conveyance called a "trike" designed for transportation where bed thickness is restricted is now being produced. Two models are in production. One model will accomodate only one man and another will carry two men or one man and an equivalent load of tools or supplies. The former model is 3 ft wide, 8 ft long and 22 in. high. It has three small rubber-tired wheels and is propelled by self-contained batteries. Preliminary trials underground have been promising and the "trike" may do for conveyor what the "jeep" did for the armed services.

Caterpillar-mounted trucks originally designed to transport cutting machines are being successfully employed to haul supplies or parts of conveyor units during the moving necessary for relocation. One difficulty with this practice has been the time required to load and unload when used to transport the heavy conveyor drive units.

There is a mine in Kentucky where local ingenuity has been applied to

Shaking conveyor loads a mine car trip

eliminate much of the menial labor and delays inherent in conventional conveyor moves. With parts mostly salvaged from Model A Ford automobiles, an axle and wheels were attached to the chain-conveyor drive units, complete with steering mechanism. While in use the drive units are blocked up enough to clear the wheels. To move the unit the sprocket chain on the drive unit is transferred to the wheel assembly. A set of "dolly" wheels and a trailing cable are temporarily added to the unit and it is trammed under its own power. By using smaller wheels and applying modifications it might be possible to make similar self-tramming conveyors that could be used in most coal beds now considered minable. The same principle could conceivably be applied to small hoists now being used to relocate conveyor equipment. If a way could be found to add wheels for tramming that would not limit the normal function of conveyor or belt units their efficiency and flexibility would be vastly improved.

Since the advent of a practical continuous-mining machine is considered possible in the near future, serious thought will be required to determine the best method to gather the coal behind these machines. As is usually the case with most mining problems no one system will likely be found to suit all conditions. Conveyors have certain inherent advantages that should be considered. They offer the logical means to maintain the continuity of the flow of coal from the face which the continuous-loader will initiate. They are adaptable under adverse natural conditions and provide dependable transportation at relatively low operating costs. With the combination of the continuous-loader, self-tramming gathering conveyors, and main-line belts, mining may begin to approach the smooth efficiency of assembly-line techniques that have long benefited other industries.

Editor's Note

Mr. Toothman's paper, giving an overall description of conveyor developments, introduced a symposium on thin seam mining which was presented at the West Virginia Institute meeting. His paper was followed by detailed descriptions of low coal operations with various types of conveying equipment—hand shoveling on face conveyors by S. S. Clarke; duckbill loading by O. G. Schwant, and mining with the conveyor-loader by Thomas E. Gettings. These papers will be published in the September MINING CONGRESS JOURNAL.

These figures are based on reports of West Virginia Department of Mines for the years 1936 to 1947

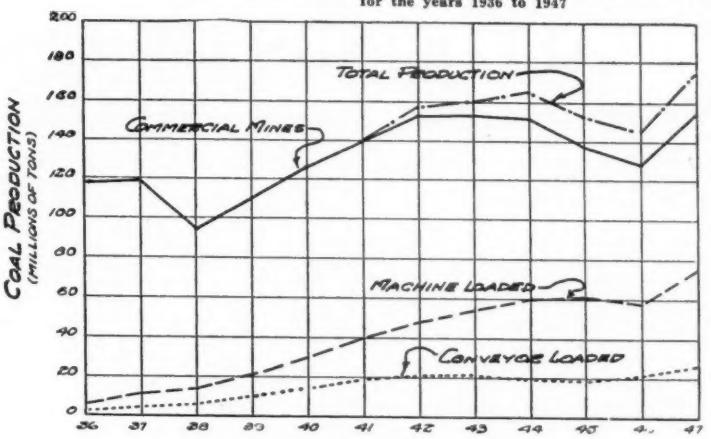


Fig. 1.—Coal production in West Virginia

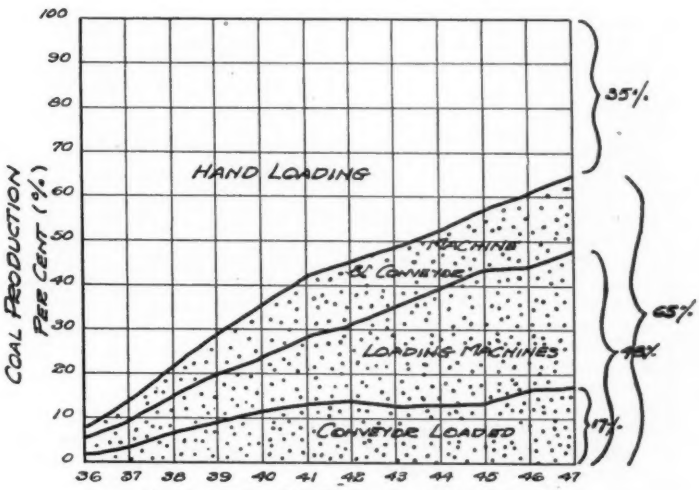


Fig. 2.—Types of loading—commercial mines only

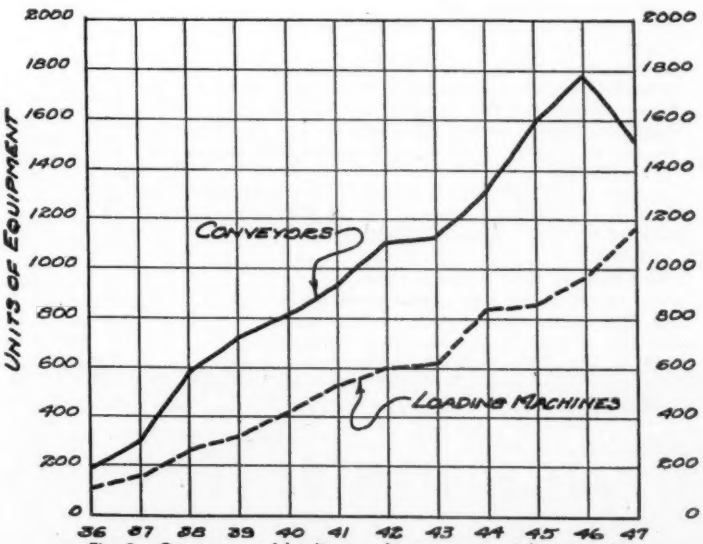


Fig. 3.—Conveyors and loading machines—commercial mines only

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200,000 sq. ft. corrugated building sheeting.
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Numerous panel boards—elec. wiring, control equipment.
257'20" conveyor layout complete.
Magnetic separator.
2—10-ton spur gear chain block carriage and track.
Bucket Elevator, 70' high 15½ x 8" buckets and motor.
55 x 24 Allis Chalmers rolls.
1—75 Marcy ball mills, with 200 H.P. motors.
3—23' x 6' Dorr Classifiers.
4—8' Belt type ball mill feeders.
8—56" 145 Fag. flotation cells/motors.
3—Banks Callow Flot. cells.
2—#3 Kimball tailings pumps.
2—Dorr 25' x 12' Thickeners—Tanks—Motors, etc.
3—Oliver Vacuum pumps 9½ x 8—15 H.P. motor.
369 Edison Battery Mine Lamps—repairs—racks, etc.
1—large steel ore storage bin.
25—10-ton 24" gauge mine cars.
35—5-ton 24" gauge mine cars.
40—20 cu. ft. 18" gauge card Z cars.
Powder cars, man cars, wheels, axles, supplies.
60#-40# Rail and spikes—bolts—fishplates.
1—24-ton car scale with weights.
22—wall telephones; 15 metal box mine phones.
11,000' used DuPont Vent. tube, 16".
1—Fire assay lab., complete.
1—10 mile aerial Tram. Buckets, etc.. Bargain.
4 miles trolley wire, hangars, cable—solid trans. line copper. Figure 8 No. 2.
15" x 24" traylor crusher.
Limefeeders—pumps—reagent feeders.
4—large air receivers, 4' x 12 or larger.
Deister standard size sand table.
40" cut off saw. Saw mill supplies.
2—200 H.P. motors, 2200 V-3-60.
1,000-gal. oil storage tank.
Jim crows, rerailers, mine switcher signals.
20,000 cu. ft. fan.
24—overhead steam fans. Building heaters.
100-ton hydraulic horiz. press.
Jeffrey vibrating grizzly feeder.
Portable compressor. 60—85—500 cu. ft.
Nearly new XRE-2-I. R. compressor, 1,000 cu. ft. *Excellent.*
I. R. 500 C.F.M. 100 H.P. comp., 440 V. Priced right.
Gard. Denver WBQ compressor & 50 H.P. motor.
2—6 x 17' B. J. pumps, 1,000 gal., 580' head, 300 H.P.
Allis Chalmers Ro-Flo 510 C.T.M.
FWD truck, dump body, underbody blade.
250 H.P. 2-drum mine shaft hoist complete.
400 H.P. 2-drum mine shaft hoist complete.
Sullivan 7½ H.P. single drum elec. hoist.
75 H.P., 60 H.P., 150 H.P., and other smaller elec. motors.
Rope master slusher blocks, all sizes.
2—adjustable drafting tables—Eng. supplies.
Complete mine rescue team layout—modern.
8—Bedroom hospital and surgical equipment.
275 lamp—elec. hat lamp outfit, complete.
2—Mancha 18" gauge battery trammers.
2—10 KVA Transformers, 2300-440/220.
6—West. Electric mine phones.
2—I.R. sharpeners. (1) Cincinnati shaper.
1—oil-fired tempering furnace I.R.
1—B. J. 375 G. P. M. 200' head pump with motor.
1—B. J. 600 G. P. M. 686' head pump with motor.
1—I. R. 200 G. P. M. 200' head pump with motor.
1—I. R. 475 G. P. M. 500' head pump with motor.
3—150 H.P. motors; 1—30 H.P. motor.
2—I. R. 7½ H.P. motor pumps.
3—DA35 Drifters—sump pumps.
3—J. B. 5 jackhammers.
2—EU & EUA single-drum hoists (air).
2—A4NN-OJ slusher hoists.
1—A5NN-OH slusher hoist.
48" slusher bucket, Pacific.
54" slusher bucket, Pacific.
30" Cate (1) piece slusher bucket.
1—1,000 cu. ft. type 10 I. R. elec. drive compressor.
1—62 KVA generator set and 50 KVA generator.
5—5 KVA dry-type transformers.
3—50 KVA transformers 6900/11950-220-440.
1—8 H.P. De Walt Woodworker.
1—40" slab saw. Gas-driven pumps.
1—Stearns Roger Timber framing saw complete.
2—36" swing cut off saws complete.
2—duplex bench grinders.
1—¾-yd. Austin Western shovel and dragline.
1—L. O. Allis Chalmers bulldozer and blade, etc.
40—mine cars, 16 cu. ft. card 18" gauge.
12—timber crates, 18" gauge.
8—assorted mine cages—skips, vertical shaft.
1—30,000 cu. ft. Rev. fan, with motor.
3—F. M. piston pumps, 3 x 4—44 gal., 400'.
1—Marvel draw-cut power saw.
Mine switch boxes, cutouts, reset boxes.
1—sample grinder, jaw crushers.
1—Rotap vibrating screen.
3—balances; 20-ton 4" grinding balls.
5—4 x 5 Hummer screens, new.
2—G. D. D79 Drifters; 2 DA35 with power feed.
3—12 B Eimco loaders.
Motors—2 H.P., 30 H.P., 75 H.P.; many sizes.
Transits and tripods.
20 barrels Hercules pine oil.
450-ton complete Flotation mill, bldgs., all motors, conduit. This is really complete and in very nice shape.
Several B. J. submersible elec. pumps.
Large compact motor drying oven.
3—Marcy ball mills—1 No. 86 and 2 No. 89.
250 H.P. 2-drum modern shaft hoist.
213 x 33 jaw crushers with motors.
Many sizes stationary elec. driven compressors.

Complete warehouse supplies.

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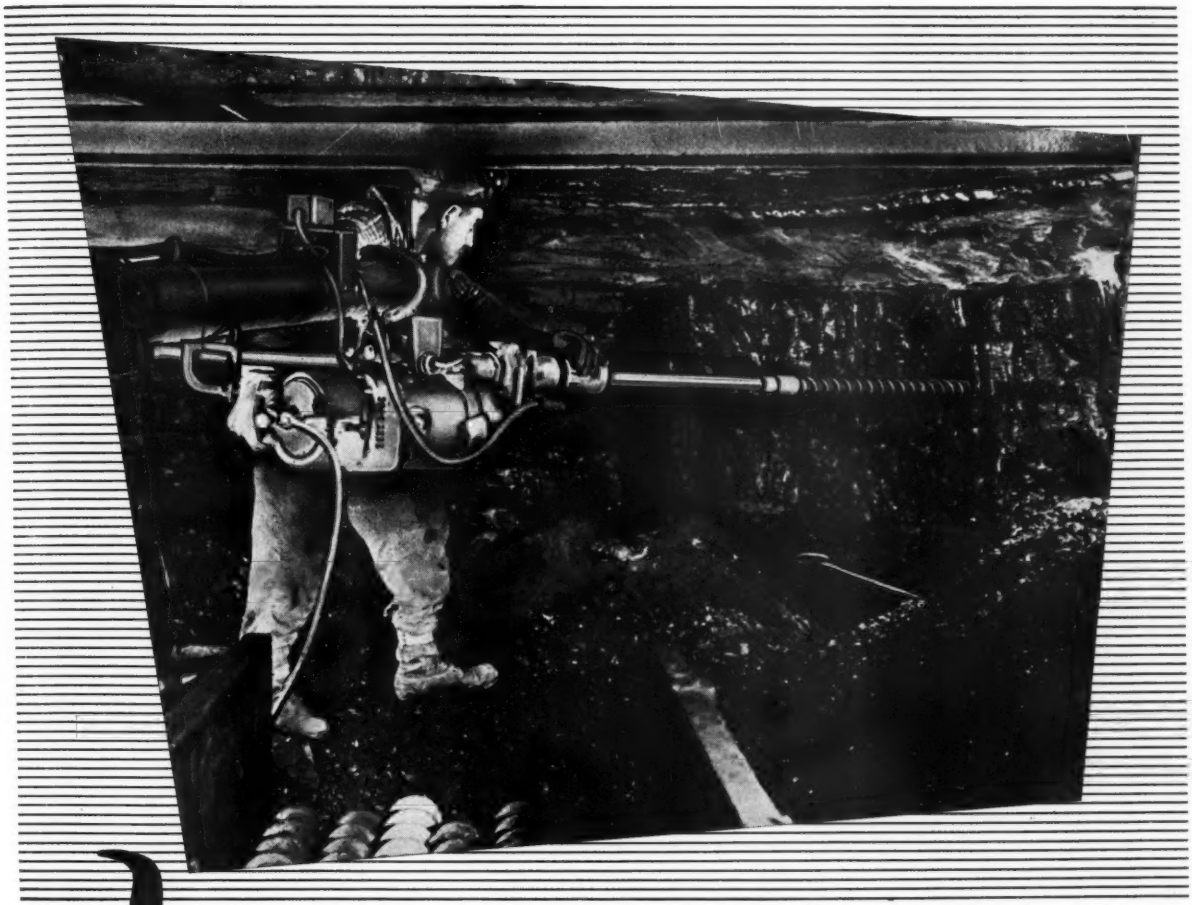

Photo courtesy of Bituminous Coal Institute

Eighty 4½ inch, 8-foot holes per shift

This Ohio mine is using two CP Model DA Drill Arms, with CP-580 permissible electric coal drills, mounted on locomotives. Each unit is operated by one man.

Working ten 22-foot places per shift, in each place eight 4½ inch diameter, 8-foot holes are drilled—four in rock and four in coal—for Airdox shooting.

Other mines using CP Model DA Drill Arms report equally outstanding production, with the unit mounted on Joy T-2 Machine trucks, revamped mine cars, etc.

The CP Model DA Coal Drill Arm Unit is electrically powered and controlled. To operate, it is merely necessary to move the unit to the face, swing the drill into position and turn on the power. Write for SP-2081 giving full information.

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IN THIS ERA OF RISING COSTS

WHY LET "HAND PICKING" OFFSET THE ECONOMIES OF MECHANIZATION?

Full-seam mechanized mining is unquestionably the lowest cost way to deliver maximum tonnage to the tipple. But the very machines and methods that cut costs underground also send up a large and variable percentage of refuse to the preparation plant.

Today, any preparation process which cannot continuously and automatically remove these fluctuating quantities of rock, draw slate, bone, etc. from feed and produce a specification fuel without hand picking is as obsolete and inefficient as pick mining, hand loading, tramway mules or "breaker boys".

Today, many authorities calculate, the wages of each "hand picker" justify a capital investment of $25,000 in precision cleaning processes, such as Heavy-Media Separation or the Dutch State Mines Cyclone Separator.

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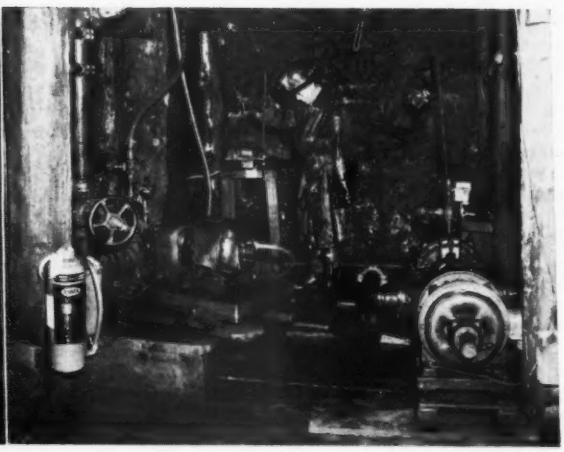
Checking the load on a transformer on the 425-ft level of the Fraser Mine



Temporary underground pump room showing pump and float switch installation in the Fraser iron mine

Proper Underground Wiring Maintenance

By CARLYLE R. BURTON
Assistant Electrical Superintendent
Oliver Iron Mining Co.

As Greater Amounts of Power Are Used in Mining, the Care of the Lines and Switches That Carry the Current to the Point of Use Becomes More Important. Costly Accidents and Time Losses from Power Failures Can Be Avoided by Planned Maintenance of All Current-Carrying Equipment.

AN outline of the proper maintenance schedule for the component parts that go to make up a complete underground electrical system, will accomplish mainly two purposes. First, the minimizing of accidents to employes due to electrical shock or the failure of electrical equipment and, second, cut down the loss in production due to electrical failure. It is the tendency of some mine supervisors to consider maintenance as unnecessary and allow only breakdown repairs to be made. It is much easier to arrange for a planned delay than to make the necessary arrangements after a piece of equipment breaks down.

In considering the proper maintenance of underground wiring, the proper installation of an underground power system must be discussed as the selection and installation of such an electrical system greatly affects the maintenance problem. One of the main problems in an installation is that of providing ample capacity. The system should be designed to handle the present mining load without excessive voltage drop and to allow for ease in adding additional capacity. The voltage drop in a system is important because it is lost power for which you pay but receive no benefit. When the actual machine voltage is less than the rated operating voltage, the machine efficiency and horsepower drop quite rapidly. The installation should not only have ample capacity but should be of good quality material installed to conform with the National Electric Code practices. The surface installation should be in accordance with the National Code standard practices and the underground installation should be made in accordance with the National Code recommendations for installations in damp areas.

Surface Installations

Starting with the main power transformers on the surface, a periodic check of the following should be made: the fence, gate, substation grounds, transformer temperature, transformer and substation insulators, switches, cables, cable end bells, and connections. The fence should be checked once a month or oftener to see that no damage has occurred to allow unauthorized persons to enter. The gate on the substation fence should likewise be checked once a month to see that the lock is in order and that the gate operates correctly. This prevents a person wasting time attempting to get into the substation in the case of an emergency. The substation grounds should be checked once a month visually, and the resistance value measured by means of a ground megger once a year. It is a good practice to maintain the substation ground resistance value at not more than 1½ ohms.

Substation transformer temperatures should be checked once a month and at the same time a visual check of the substation and transformer insulators should be made. Once a year the insulators should be cleaned, using an insulator cleaner. The visual inspection of the transformer temperatures may give one a forewarning of an overload condition that may be developing and gives a check on the level of the transformer cooling me-

dium. The dielectric strength of the oil should be tested once a year. At the monthly substation inspection, a visual inspection of the connections, cables, and cable-end bells should be made. The main power cables leading from the substation to the distribution panel should be "meggered" once a year. By "meggering" the cable and recording the value an indication of the condition of the electric insulation of cables is obtained.

Power House Maintenance

Surface and underground distribution breakers should be inspected once a week to see that the operating temperatures of the breakers are not excessive. Once a year the circuit-breaker blades and fingers should be checked and the oil tested. If the source of power for the underground tramming is located in the engine house, the level of the oil in the bearings should be checked daily. The condition of the brushes and of the oil should be checked weekly. The bearing oil should be changed whenever the sludge becomes excessive.

Once a year the d-c motor generator set or rotary converter should be meggered and the set washed off with a solution made by mixing carbon tetrachloride with a trade cleaning solution. Good ventilation and air line respirators should be provided for the man doing the spraying. The hoist motors, hoist control, air-compressor motors, and auxiliary motors should be put on the same type of maintenance schedule as outlined for the underground locomotive power supply. The hoist control and slack-cable indicator are inspected once a month and reset at the time the cage and skips are tested. All the motors and generator frames, motor and generator switches, cases and control panels should be connected to a ground of not more than 5 ohms value.

Sufficient disconnecting switches and sectional overload protection should be provided in the original installation of the underground electrical system to facilitate the location of trouble and prevent large portions of the mine being without power due to trouble in one small section. There should be sufficient disconnecting switches so that the power may be removed from sections of the mine where no men are working. They should be so arranged that as the men leave their working places and come toward the shaft they can cut off all the power behind them.

Cables and Splices

The only maintenance required for the main power and single cables, that are usually installed in the main hoisting shaft, is a check of the condition of the supporting clamps, corrosion of the cables, and "meggering" of the cables once a year. The underground end of the signal cable usually terminates in a heated junction box to prevent the absorption of moisture. Once a week the heated junction boxes should be checked to make certain they are operating. Periodically the cable grounding should be inspected to make certain it is "continuously" grounded, that is, jumpers provided around junction boxes and splices, and the cable sheath grounded at each end.

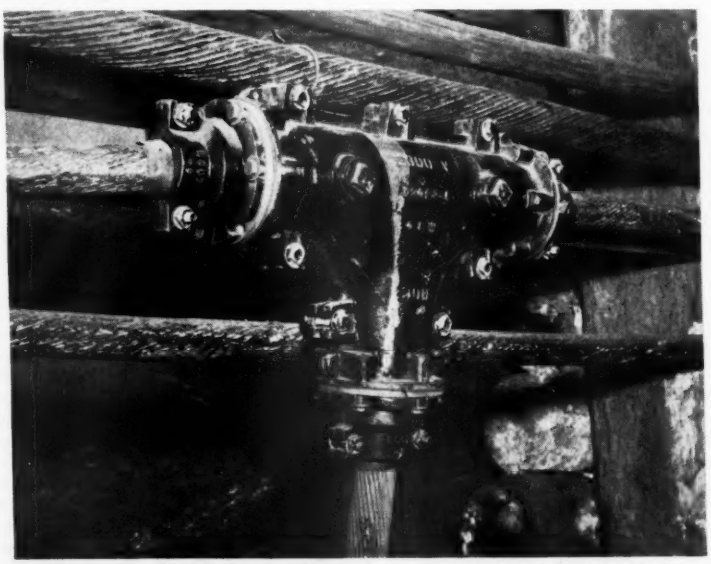
Whenever possible a cable splice should be enclosed in a painted metal box filled with compound. An emergency splice may be made using varnished cambric tape next to the conductor, then sealing this with rubber tape and applying cotton or friction tape over the rubber. With regard to the underground distribution cables no maintenance procedure is required if a sound installation and repair procedure is adopted. Cables should be suspended high enough to prevent damage due to car derailment, out of danger of squeezing by crushing timber, and secured away from direct contact with the timber. The cables may be hung using metal "J" hooks, clamps that provide an air space between the cable and the wood post, or tieing the cables to insulating knobs. No maintenance program is required for distribution cables but there is the ever-present problem of making certain that clamps are replaced after retimbering. When cables are to be replaced or on new installation it is well to consider the purchase of cables with noninflammable jackets.

Underground substations should receive the same attention with regard to installation and maintenance as surface substations except the transformers should be air cooled or the cooling medium noninflammable. A ground detector should be installed if an a-c underground power system is used.

Pump Stations

A maintenance program designed to operate underground pumps successfully is as follows: The installation should be made in as clean and dry a place as possible using the same or greater electrical clearances than used for surface installations. The pump motors should operate as nearly continuously as possible. Frequent starting and stopping causes unnecessarily high power peaks to be established, allows more rapid deterioration of motor-winding insulation due to heating and cooling of windings, and requires more frequent maintenance of the pump starting control. Pump motors and their controls that are not often used should be inspected and meggered once a month while those used frequently should be inspected once a week and meggered every three months. The pump motor and control must be carefully grounded by tieing the pump, control, pipe line, set steel, and track together as one ground system.

The pump control should be installed in a safe area where it is dry and free from blasting damage during sinking and development operations. It has been found advisable from past experience in extremely wet areas to fit the pumps with a short 10 to 15-ft connecting cable that may be readily disconnected for pump removal. This short cable is installed in a dry location and the motor junction box sealed with pliable, putty like, sealing compound, having high dielectric strength. Pump float switches are a minor maintenance problem when float-operated



Typical high-voltage splice and tap in mine of Oliver Iron Mining Co.

mercury switches or the electronic-type level controls are used. In case a pump setup is operated unattended, except for periodic inspections, it is advisable to install a second float to operate an alarm when the water reaches a point a few inches above the pump starting point of the pump control float switch. It is advisable to equip the float switch with a short piece of connecting cable that has been previously sealed between the float switch case and the cable and also to substitute a dry reconditioned float switch every month.

Scrapers Require Special Care

The scraper or tugger-motor electrical connections should receive special attention from the underground electrical organization because they are contacted daily by the miners. Installation in a large mine is frequently a daily problem. A fused switch or magnetic starter with overload protection should be provided near the working place of the tugger. A disconnect switch should be provided at the tugger so power may be removed by the tugger operator in case of an emergency. This switch also permits the operator, as required, to disconnect the power whenever he leaves the tugger.

All tugger switches, as well as the tugger, must be grounded. By grounding, is meant, in addition to the ground lead in the cable being connected to the switch and tugger, a separate ground wire is run from the switch or tugger to the air line or track, preferably both. The switches should be inspected periodically to see that they are securely mounted, grounds are in place, knockout seals installed, arc chutes properly installed, blades clean, and sufficient blade contact pressure to prevent heating.

Once a month a few drops of oil should be applied to the handle operating mechanism or operating arm. The blades or tips should be wiped clean with a rag, any burrs removed, and a small amount of petrolatum applied to any sliding contacts. The same switch installation and maintenance procedure should apply to the contract lighting unit and fan installation except that only one switch is used for both overload protection and a disconnecting device and is located at the fan or lighting unit.

Some thought is being given to the advisability of constructing a light metal rack or stand that could be mounted between the posts to accommodate the lighting unit, tugger, and fan switch. This unit would have one main cable feeding it and the line side of the switches permanently wired together. The load side of the switches could be equipped with disconnecting plugs as is now the practice in some mines. Such an installation would eliminate the jumper cables now used between switches. These are looped around the switch mounting planks and posts and create a potential fire hazard.

Underground Illumination

General drift lighting is usually provided by installing at various intervals, lighting-unit stands made up by mounting a 2 kw 440 to 220/110 v transformer and a fused 600 v switch on a light pipe framework. The drift lights are usually placed 50 to 100 ft apart and are located near the center of the drift to provide general illumination. Every 100 ft a safety zone is provided for employes to step into when trains or locomotives are approaching. These areas may be marked with a blue light offset a little from the row of general drift lights.

Drift lights are usually installed with rubber insulated open wire supported on porcelain nail-it knobs. Conduit must be used in dry locations such as pump rooms, transformer rooms, fuse houses, and similar locations. If moisture may be encountered, it is better practice to make lighting runs using rubber-covered cable and metal junction boxes provided with rubber bushings supported by means of an insulating material. The illumination at the working place is usually provided by a rubber-covered extension cord with a floodlight reflector of some type. The use of three conductor cord with the ground conductor attached to the reflector body is good practice. Usually the only maintenance required for the lighting system is to replace burned out lamps, repair damaged working-place light cords, check loading of lighting units, and resuspension after retimbering.

Blasting Circuits

Blasting circuits require regular maintenance by the mine electrician. He must see that the blasting switch is kept dry and clean, and that the shorting switches and the blasting lead and ground connections are in good order. The complete blasting circuit must be checked every week. A good check on the blasting circuit can be made by installing a lamp on the end of the blasting lead and go through the regular blasting procedure.

Hand lamp with flood reflector illuminates working face at Godfrey mine

Haulage System

The trolley wire should be mounted using trolley-wire support insulators eliminating contact with the wood caps. Guard boards should be installed on the side of the trolley wire near areas where men working with hand tools might contact the wire. It is recommended that disconnecting switches be installed at loading chutes so trolley power may be removed at the section directly in front of the chute. Sectionalizing switches with overload protection should be installed at various locations in the mine to facilitate the isolation and location of trouble. The haulage track must be bonded across the rail joints, between

(*Continued on page* 52)

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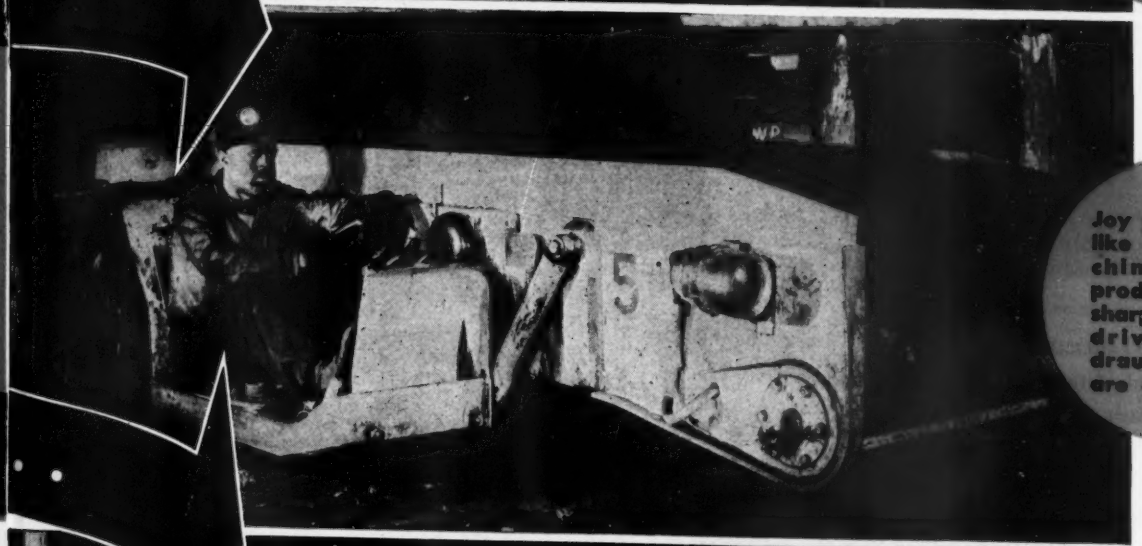

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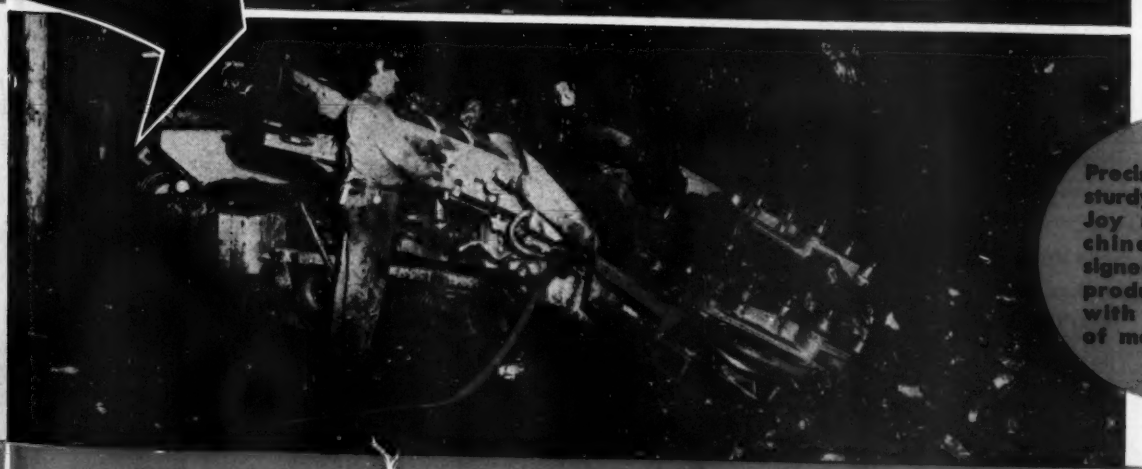

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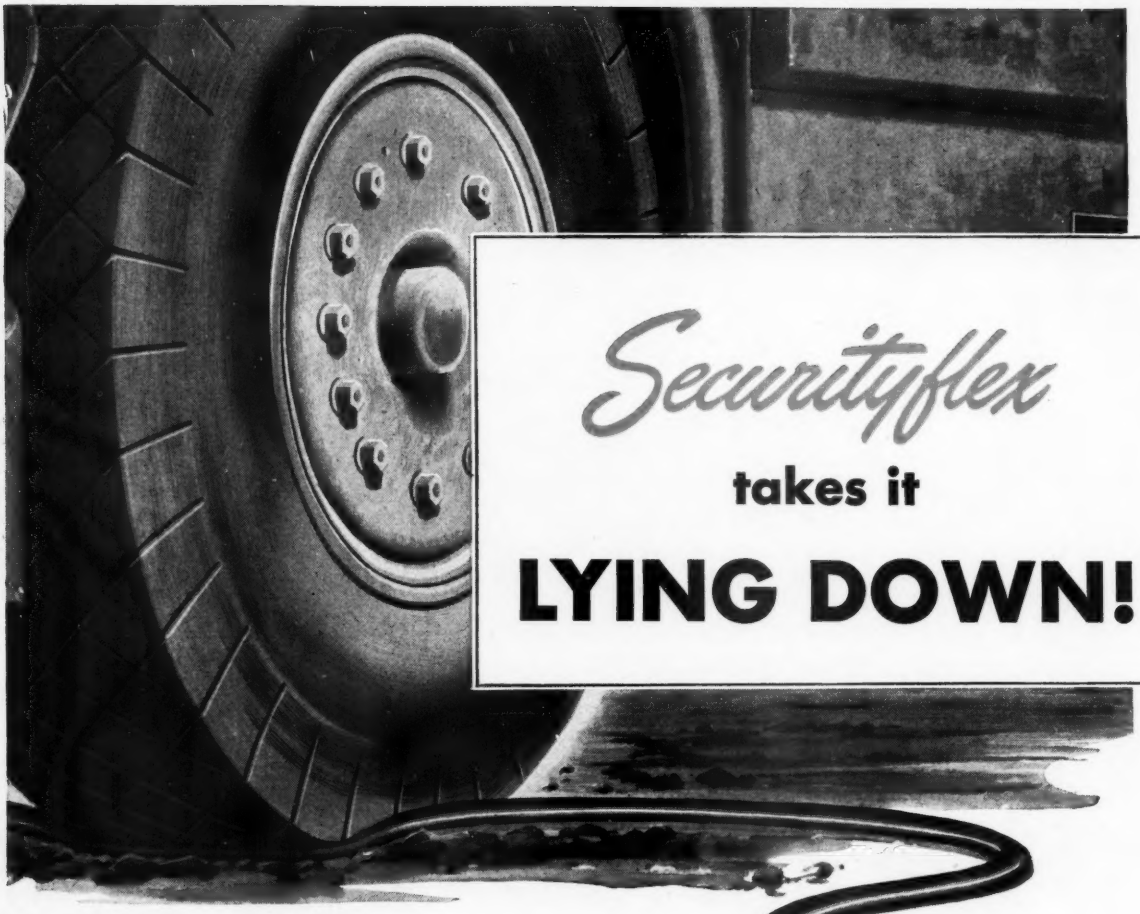

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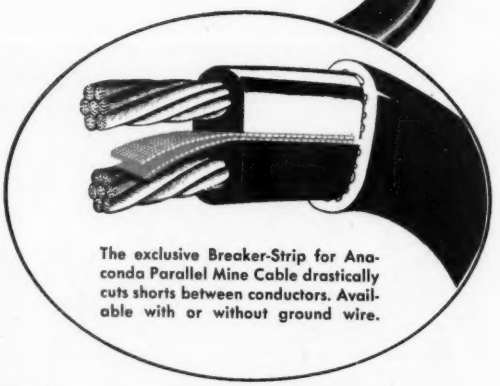

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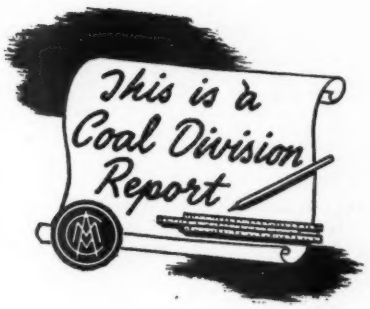
Gathering Haulage With Mine Cars



A Report Showing Methods of Estimating the Cost of Installing, Maintaining, and Operating an Underground Track System

By the Committee on Haulageroads

THE study on coal mine transportation being conducted jointly by the Haulageroad and Conveyor Committees, is continued with the report submitted here, which supplements the report published in the January 1948, MINING CONGRESS JOURNAL on Gathering Haulage with Belt Conveyors. It presents estimates on costs for installing, operating, and maintaining gathering haulage with mine cars under specifications closely paralleling those used by the Conveyor Committee, and covers the mine car movement from the main line to the room necks on a producing entry—what is frequently termed the intermediate, or "swing" haulage. As in the belt study, the method of loading and bringing the coal from the face to the room necks is not taken into consideration. The estimates do not and are not intended to apply to any actual operating mine, but for the purpose of giving a clear understanding of the figures used, and to show what the report covers, a sketch or diagram of a section of a mine is submitted. This in general conforms to the plan used by the Conveyor Committee,—having two entries on production and one on development.

Although the two committees are not endeavoring to say whether belts or mine cars furnish the most economical means of underground transportation, it is their idea to confine the reports to seam conditions where both types of equipment are considered to be equally efficient; that is where comparisons would be based on cost and not on performance. These competitive limits are taken by the Haulage Committee as ranging from level grades to plus and minus 4 per cent grades in seam heights of 4 ft and 6 ft. Further specifications are assumed as follows:

(a) The production is to be 1200 tons of coal per shift—500 tons from each producing entry and 200 tons from the development. Working on two shifts and loading 2400 tons per day, the annual output for a year of 250 days would be 600,000 tons.

(b) A room panel is 2000 ft long, with a 200-ft barrier pillar. It is developed by three entries with rooms 300 ft long, driven to the right and left.

(c) An 80 per cent coal recovery is assumed, making the following productions from a room panel: 138,240 tons from a 4-ft seam; 207,360 tons from a 6-ft seam.

(d) Prices for material and equipment are to be as of March 1947.

(e) Equipment is to be depreciated at 10 per cent, with interest at 3 per cent. Investment costs per ton are based on an annual production of 600,000 tons.

(f) Supplies and replacements are taken at 10 per cent of the purchase cost except where experience indicates that other rates should be used. The costs per ton are based on the panel productions given in (c) above.

(g) Labor rate is $1 per man hour.

(h) Electric power is 250 V dc furnished at 2c per hwhr.

(i) The track and belt reports will not include costs for power conversion, equipment or substations. This phase

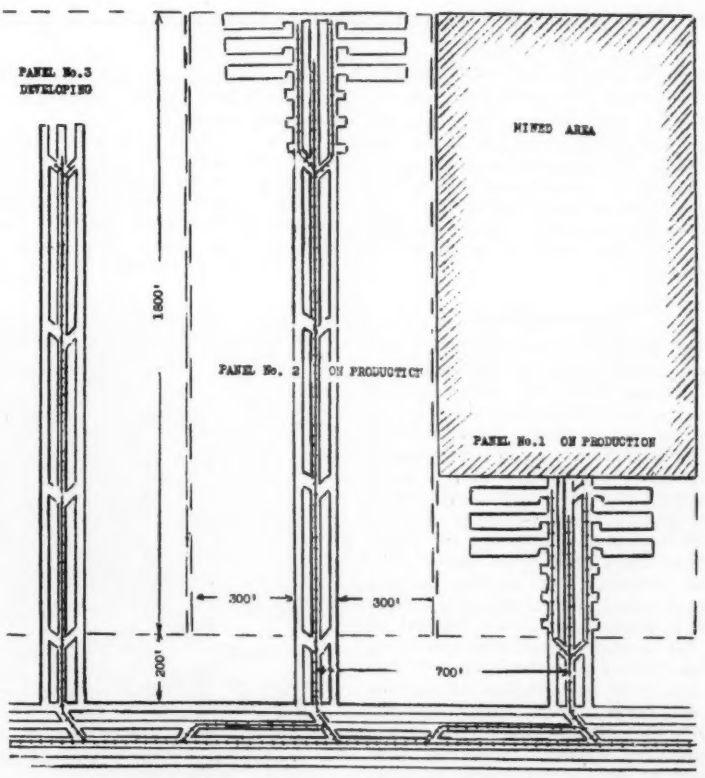


Diagram of track gathering system used as basis for report

SUMMARY OF COSTS FOR TRACK GATHERING HAULAGE

	Operating a 6-ft Seam					Operating a 4-ft. Seam				
	Interest Depreciation	Supplies Replacements	Labor	Power	Total	Interest Depreciation	Supplies Replacements	Labor	Power	Total
Level Grade:										
Locomotives	.0023	.0018	.0074	.0021	.0136	.0023	.0018	.0074	.0021	.0136
Mine Cars	.0062	.0048	.....	.....	.0110	.0062	.0048	.....	.....	.0110
Track	.0023	.0040	.0216	.....	.0279	.0023	.0060	.0325	.....	.0408
Wiring	.0007	.0012	.0011	.....	.0030	.0007	.0019	.0018	.....	.0044
Total	.0115	.0118	.0301	.0021	.0555	.0115	.0145	.0417	.0021	.0698
Plus 2% Grade:										
Locomotives	.0030	.0023	.0076	.0034	.0163	.0030	.0023	.0076	.0034	.0163
Mine Cars	.0062	.0048	.....	.....	.0110	.0062	.0048	.....	.....	.0110
Track	.0023	.0040	.0216	.....	.0279	.0023	.0060	.0325	.....	.0408
Wiring	.0007	.0012	.0011	.....	.0030	.0007	.0019	.0018	.....	.0044
Total	.0122	.0123	.0303	.0034	.0582	.0122	.0150	.0419	.0034	.0725
Plus 4% Grade:										
Locomotives	.0054	.0041	.0150	.0062	.0307	.0054	.0041	.0150	.0062	.0307
Mine Cars	.0062	.0048	.....	.....	.0110	.0062	.0048	.....	.....	.0110
Track	.0023	.0040	.0216	.....	.0279	.0023	.0060	.0325	.....	.0408
Wiring	.0013	.0021	.0015	.....	.0049	.0013	.0030	.0021	.....	.0064
Total	.0152	.0150	.0481	.0062	.0845	.0152	.0179	.0496	.0062	.0889
Minus 2% Grade:										
Locomotives	.0023	.0018	.0074	.0012	.0127	.0023	.0018	.0074	.0012	.0127
Mine Cars	.0062	.0048	.....	.....	.0110	.0062	.0048	.....	.....	.0110
Track	.0023	.0040	.0216	.....	.0279	.0023	.0060	.0325	.....	.0408
Wiring	.0007	.0012	.0011	.....	.0030	.0007	.0019	.0018	.....	.0044
Total	.0115	.0118	.0301	.0012	.0546	.0115	.0145	.0147	.0012	.0680
Minus 4% Grade:										
Locomotives	.0046	.0036	.0147	.0025	.0254	.0046	.0036	.0147	.0025	.0254
Mine Cars	.0062	.0048	.....	.....	.0110	.0062	.0048	.....	.....	.0110
Track	.0023	.0040	.0216	.....	.0279	.0023	.0060	.0325	.....	.0408
Wiring	.0007	.0012	.0011	.....	.0030	.0007	.0019	.0018	.....	.0044
Total	.0138	.0136	.0274	.0025	.0573	.0138	.0163	.0490	.0025	.0816

Details of the above estimates are found in the following tables.

is being studied by the Power Committee, who will later submit reports.

On the basis of the above assumptions and specifications, the Committee presents the accompanying estimates on installing, maintaining, and operating a complete gathering or intermediate transportation system extending from the room necks to the main line haulage.

Locomotives

The estimates for the locomotives cover an operating section of a mine as illustrated on the accompanying sketch—two entries on production and one on development. The mine-car capacity is to be 6 tons—weighing 3 tons empty and 9 tons loaded. A shift production of 1200 tons would mean that each room entry must produce 84 loads during the shift and the development must produce 36 loads. The most frequent car service possible with a single locomotive for all three entries is one hour. This is determined by the distance (including switching at terminals) that the locomotive has to travel for one complete car service to all three panels (approximately 12,600 ft); the average speed of the locomotive while in operation (assumed to be 500 fpm) and terminal delays for coupling, etc. (assumed to be 5½ minutes each for the six terminals in a complete round trip to the three panels).

On a one-hour service schedule, a trip would haul 12 cars to each of the producing entries and five cars to the developing entry. On level and light grades, heavier trips could be handled, but the travel rate would be slower; for a 1½-hour round trip time, 18 cars would be hauled to each of the producing entries and eight to the developing entry. Where steep grades require that the trips be less than 12 cars, in order to keep the size of the locomotive within practical limitations, more frequent car service is necessary and two locomotives are needed for the production. All the foregoing assumes a seven-hour shift,

Well constructed and maintained haulageways reduce operation costs

MINE LOCOMOTIVES REQUIRED FOR VARIOUS GRADES

For 1200 Tons Per Shift

Grade	No. of Cars in Trip: Produc. Entry	No. of Cars in Trip: Develop. Entry	Locos. Req'd	Max. Tractive Effort or Braking Effort	Size of Locos.	Approx. Max. Current for One Loco.	Annual Power Consump. kwhr	Loco. Costs March, 1947
Level	18	8	1	4860 lbs	10 ton	420 amp	63,750	$10.730
2% against load	12	5	1	7080 lbs	15 ton	620 amp	102,500	13,980
4% against load	6	3	2	6440 lbs.	13 ton	540 amp	185,000	24,900
2% with load	12	5	1	4720 lbs	10 ton	260 amp	36,750	10,730
4% with load	6	3	2	5120 lbs	10 ton	260 amp	74,500	21,460

ESTIMATED COST OF INSTALLING, MAINTAINING AND OPERATING LOCOMOTIVES

For an Annual Production of 600,000 Tons

Grade	Annual Charges: Interest 3%	Depreciation 10%	Maintenance: Supplies	Maintenance: Labor	Power at $.02 per kwhr	Operating Labor	Total Annual Cost	Total Cost Per Ton
Level	$321.90	$1,073.00	$1,073.00	$416	$1,275.00	$4,000.00	$8,158.90	$.0136
2% against load	419.00	1,398.00	1,398.00	542	2,050.00	4,000.00	9,807.40	.0163
4% against load	747.00	2,490.00	2,490.00	964	3,700.00	8,000.00	18,391.00	.0307
2% with load	321.90	1,073.00	1,073.00	416	735.00	4,000.00	7,618.90	.0127
4% with load	643.80	2,146.00	2,146.00	832	1,490.00	8,000.00	15,257.80	.0254

and estimates for the cost of the locomotive gathering under various seam heights and grades, are submitted in the accompanying tables.

Mine Cars

As this report covers gathering haulage only, regardless of the number of working places, it is therefore assumed that the same number of mine cars will be needed for gathering on any of the grades and in the seam heights specified. Mine cars of 6-ton capacity are considered to be suitable for operating under these conditions and it is further considered that a gathering haulage round trip time of 1½ hours is within the practicable limit. Then, on the basis of a 1½-hour car service, the number of cars needed for a room panel loading 500 tons per shift would be calculated as follows:

$\frac{500 \text{ tons}}{6\text{-ton car}}$ requires 84 cars loaded per 7-hour shift.

$\frac{84 \text{ cars}}{7 \text{ hours}} \times 1.5$ hours requires 18 cars on each 1½-hour service trip.

By this same formula, a developing entry loading 200 tons per shift requires eight cars per trip which, added to the 36 needed for the two-room panels, would mean 44 cars in production service—either at the faces or at the section sidetracks. In addition, there would be 44 cars being handled by the swing locomotive, making a total of 88 cars for the main line sidetracks and the working sections. Then, figuring a main line trip of 22 cars, there would be 22 cars in transit on the main line and 22 standing at the tipple, which added to the gathering trips, makes 132 cars in active operation. Adding 10 per cent for shop and supply service, brings the total to 145 cars from face to tipple. The main line haulage was covered in a previous report of our committee published in August 1947, which estimated that 110 mine cars were needed for main line use; consequently, 35 cars would be added for gathering service and the price of 35 mine cars is used for the gathering haulage estimate. For an annual production of 600,000 tons,

ESTIMATED COST OF TRACK MATERIAL FOR ONE PANEL

Material	Amount Used	Unit Price	Purchase Cost	Times Used	Replacement	Charged to Entry
Rails 40 lb	40 Tons	$72.00	$2,880.00	10	10%	$288.00
Angle bars	204 Pr.	.82	167.28	5	20%	33.45
Bolts	2 Kegs	16.80	50.40	2	50%	25.20
Spikes	11 Kegs	12.20	134.20	2	50%	67.10
Turnouts	5	195.00	975.00	10	10%	97.50
Switch Ties	5 Sets	23.15	115.75	2	50%	57.87
Cross Ties	2070	.50	1,035.00	4	25%	258.75
Total Cost for One Panel			$5,357.63			$827.87
Material Cost for Three Panels			$10,715.26			

TRACK COST IN A 6-FT SEAM

Materials:

Depreciation at 10% and Interest at 3% on $10,715.26 equals $1,393.00 for year Investment cost for annual production of 600,000 tons equals ..... $.0023 per ton

Replacement cost of $827.87 for 207,360 tons equals ..... .0040 per ton

Labor:

3,000 ft track at $1.25 equals $3,750.00
5 switches at $147.50 ..... 735.50

$4,485.50 for 207,360 tons equals ..... .0216 per ton

Total Cost of Track ..... $.0279 per ton

TRACK COST IN A 4-FT SEAM

Material:

Depreciation at 10% and Interest at 3% on $10,715.26 equals $1,393.00 for year Investment cost for annual production of 600,000 tons equals ..... $.0023 per ton

Replacement cost of $829.60 for 138,240 tons equals ..... .0060 per ton

Labor:

3000 ft track at $1.25 equals $3,750.00
5 switches at $147.50 ..... 735.50

$4,485.50 for 138,240 tons equals ..... .0325 per ton

Total Cost of Track ..... $.0408 per ton

Ventilation must be considered in gathering with any type of equipment —*Photo by U. S. Bureau of Mines.*

Purchase Cost of 35 Mine Cars at $825.00 equals $28,875.00	
Interest at 3% and 10% Depreciation equals $3,754 or	$.3062 per ton
Maintenance and Supplies minus 10% equals $2,888 or	$.0048 per ton
Total Mine Car Cost	$.0110 per ton

their per-ton cost would be as given in the table above.

Track and Wiring

The cost for the haulage roads includes all material and labor for the installation, maintenance and removal of the track and wiring plus the investment charges based on an annual production of 600,000 tons. To produce this tonnage, the mine area requires three operating panels—two on production and one on development, as shown on the accompanying sketch. However, as a room entry retreats, its track and wiring is dismantled and moved ahead to the developing entry so, theoretically, the amount of material in constant use would be equivalent to the amount needed for two complete panels. The accompanying tables estimate the installation for one complete panel; consequently, the interest and depreciation charges per ton should be applied to twice the amount of the purchase cost shown.

The tonnage cost for the replacement of material lost, worn and broken in the ordinary course of operation during the life of the panel is based on the total coal production from the panel when mined to completion. This varies inversely as the seam height and one room panel shown in the accompanying sketch, with an 80 per cent coal recovery, would produce 207,360 tons in a 6-ft seam and 138,240 tons in a 4-ft seam. The replacement cost charged to the entry depends on the number of times that each class of material can be removed for re-use; the figures in the tables are believed by the committee to represent average expectancy under efficient management.

ESTIMATED COST OF WIRING AND BONDING MATERIAL FOR ONE PANEL

For Level, Plus and Minus 2% Grades, and 4% Grades with the Loads 620 Amp Allowable Capacity

Material	Amount Used	Unit Price	Purchase Cost	Times Used	Replacement	Charged to Entry
Sec. 9 trolley	3600 lbs	$.31	$1,116.00	10	10.0%	$111.60
Hangers	150	1.79	268.50	10	10.0%	26.85
Section switches	3	25.54	76.62	3	33.3%	25.54
Trolley splices	6	1.70	10.20	2	50.0%	5.10
Trolley frogs	5	5.31	26.55	3	33.3%	8.85
Rail bonds	132	1.49	196.68	3	33.3%	65.56
Cross bonds	10	2.17	21.70	3	33.3%	7.23
Total Cost for One Panel			$1,716.25			$250.73
Material Cost for Three Panels			$3,432.50			

WIRING COST IN A 6-FT SEAM

For Level, Plus and Minus 2% Grades and 4% Grades with the Loads

Material:	
Depreciation at 10% and Interest at 3% on $3,432.50 equals $446.16 for year Investment cost for annual production of 600,000 tons equals	$.0007 per ton
Replacement cost of $250.73 for 207,360 tons equals	.0012 per ton
Labor:	
30 man-shifts at $8.00 equals $240.00 for 207,360 tons	.0011 per ton
Total Cost of Wiring	$.0030 per ton

WIRING COST IN A 4-FT SEAM

For Level, Plus and Minus 2% Grades and 4% Grades with the Loads

Material:	
Depreciation at 10% and Interest at 3% on $3,432.50 equals $446.16 for year Investment cost for annual production of 600,000 tons equals	$.0007 per ton
Replacement cost of $250.73 for 138,240 tons equals	.0019 per ton
Labor:	
30 man-shifts at $8.00 equals $240.00 for 207,360 tons	.0018 per ton
Total Cost of Wiring	$.0044 per ton

ESTIMATED COST OF WIRING AND BONDING MATERIAL FOR ONE PANEL

For 4% Grades Against the Loads—1,080 Amperes Allowable Capacity

Material	Amount Used	Unit Price	Purchase Cost	Times Used	Replacement	Charged to Entry
4/0 trolley	1959 lbs	$.31	$607.29	10	10.0%	$60.73
Hangers	150	1.79	268.50	10	10.0%	26.85
Section switches	3	25.54	76.62	3	33.3%	25.54
Trolley splices	6	1.70	10.20	2	50.0%	5.10
Trolley frogs	5	5.31	26.55	3	33.3%	8.85
Rail bonds	132	1.49	196.68	3	33.3%	65.56
Cross bonds	10	2.17	21.70	3	33.3%	7.23
750,000 cm feeder	4632 lbs	.31	1,435.92	10	10.0%	143.59
Hangers	150	2.10	315.00	10	10.0%	31.50
Section switches	3	34.03	102.09	3	33.3%	34.03
Total Cost for One Panel			$3,060.55			$408.98
Material Cost for Three Panels			$6,121.10			

ESTIMATED WIRING COST IN A 6-FT. SEAM

For 4% Grades Against the Loads

Material:	
Depreciation at 10% and Interest at 3% on $6,121.10 equals $795.73 for year Investment cost for annual production of 600,000 tons equals	$.0013 per ton
Replacement cost of $408.98 for 207,360 tons equals	.0021 per ton
Labor:	
36 man-shifts at $8.00 equals $288.00 for 207,300 tons	.0014 per ton
Total Cost of Wiring	$.0049 per ton

ESTIMATED WIRING COST IN A 4-FT SEAM

For 4% Grades Against the Loads

Material:	
Depreciation at 10% and Interest at 3% on $6,121.10 equals $795.43 for year	
Replacement cost of $408.98 for 138,240 tons equals	.0030 per ton
Investment cost for annual production of 600,000 tons equals	$.0013 per ton
Labor:	
36 man-shifts at $8.00 equals $288.00 for 138,240 tons	.0021 per ton
Total Cost of Wiring	$.0064 per ton

It is assumed that the same type of track construction and material will be suitable for all the seam heights and grade conditions under consideration; this also applies to the wiring and bonding with one exception, a 4 per cent grade against the loads requires more power which is obtained through a trolley and feeder line. The following specifications were used in calculating the size of trolley and feeders as submitted in the cost estimates of the wiring and bonding.

For a level grade, one 10-ton locomotive will take a maximum current of approximately 420 amp at 250 v.

For a 2 per cent grade against the loads, one 15-ton locomotive will take a maximum current of approximately 620 amp at 250 v.

For a 4 per cent grade against the loads, two 13-ton locomotives will each take a maximum current of approximately 540 amp at 250 v. Since only one locomotive at a time will be operating on any particular entry, the copper required in that entry is based on the current requirements of one locomotive.

For a 2 per cent grade with the loads, one 10-ton locomotive is required and the maximum current is approximately 260 amp at 250 v.

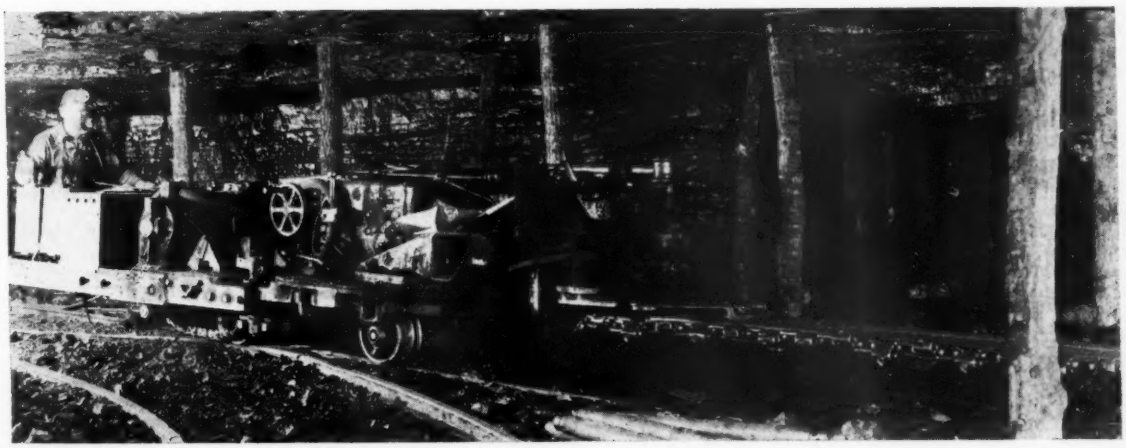
For a 4 per cent grade with the loads, two 10-ton locomotives are required and the maximum current is approximately 260 amp for each locomotive. Here again, only one locomotive at a time will be operating on any entry.

Conclusion

In submitting this report, the Committee wishes to repeat that the figures should not be applied directly to any actual mine operation. All estimates are based on assumptions—price and quantity of equipment and material as well as mining conditions and operating performances—and it is obvious that these would not have universal application even within the range of seam heights and grades specified. Our purpose is to show what factors must be taken into account when planning a mine transportation system and to illustrate methods of estimating installation and operating costs for gathering haulage with locomotives and mine cars.

C. C. HAGENBUCH,
Chairman.

A. R. ANDERSON.
J. B. HASKELL.
S. G. HUGHES.
E. H. JENKS.
J. F. MAURER.



Mica books are picked out with care in a mine of the Custer Mining Account

Mica Industry Problems

Coordination of Mining, Processing, and Fabrication Essential to Economic Success.

★

By J. WRAY SHARP

★

DESPITE a steady demand for mica in peace and in war the mica industry has neglected the mining of its raw material. This has been due to the ease of securing cheaply-mined, foreign mica, and to the smallness of deposits in America. Domestic mica mining has become in most instances a hand-to-mouth affair of individual entrepreneurs engaged either in mining mica directly or producing mica as a by-product of feldspar extraction.

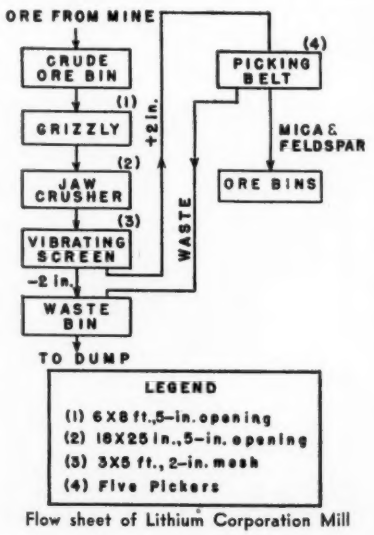
This prevailing haphazard approach to mica mining is not inherently necessary. Much scientific work is being done. Recent studies by the U. S. Geological Survey and the Bureau of Mines on pegmatites, the coarsely crystalline magmatic deposits in which mica is found, have proved the zonal theory of mica occurrence. A dozen different sequences of mineralization have been established. The work of Dr. Lincoln Page of the Survey has been especially important in this field.

As evidence of values that may be found in small pegmatites it may be noted that the Custer Mining Account of Custer, S. D. mined over $480,000 worth of strategic mica in less than two years from the Victory mine. The prices paid for this mica by Colonial Mica, the agent for Metal Reserves, were subsidy prices. However, the pegmatite was not large and the values would have approximated $100,000 under peace-time prices.

Development by diamond drilling and a 60-ft shaft on another property owned by this company indicates feldspar, mica, and lithium reserves.

It has become increasingly apparent that pegmatites must be mined as a unit with methods designed to recover the last ounce of profitable ore whether it be mica, feldspar, beryl, lithium minerals, tantalite, or whatever of the numerous rare minerals that are likely to be found in a pegmatite.

The valuation of mica deposits is unusually difficult due to the heterogeneous nature of the ore. Mica books vary greatly in size in all three dimensions so that the cubic contents of any one book becomes one criterion as to whether it should be recovered at the face by hand, on a picking belt, or by screening.



Flow sheet of Lithium Corporation Mill

Judgment in Processing

Mica books vary in crystallization. One book may be sufficiently large to recover profitably at the face or on a picking belt, if it is also flat and free splitting. Again a book of the same size, if cross grained or wedge shaped, might be worth recovery only in the cheaper process of crushing and screening.

The decision is further complicated by the variation in electrical qualities intrinsic in the mica found in a given ore shoot. A particular book may be large enough, and sufficiently free splitting to be profitably recovered if the electrical properties are such as to guarantee its complete or partial use as condenser film. Yet the same book may be submarginal for hand recovery if the staining inherent in the mica precludes it from such use.

These difficulties extend into the grade and class demands of sheet. It is only one step above scrap, and has as its two principal requirements firmness and a moderate degree of flatness.

Unless the rifting of mica is carefully controlled either one of two things is liable to occur. First, too small pieces may be rifted for use as washer and punch so that the values recovered are less than the cost of labor expended. The danger is that a rifter may unknowingly camouflage this activity due to the great variation in the sizes of books handled. At the end of the day the total values recovered may considerably exceed the cost of the day's labor by virtue of the extensive margin above costs provided by the larger books rifted. Yet the net value remaining after rifting may be much less than it should be because submarginal books have been rifted.

On the other hand the more general tendency is to prevent rifters from handling books which may be quite profitable. The result is that although the cost per pound recovered is low the total net value of the operation is diminished by discarding to scrap books in which the profit may be only a few cents.

Mica books from Spruce Pine, N. C., are large but contain few large sheets

The choices to be made at these various steps in the process of mining and rifting are complicated further by the requirements of the mica fabricators. They quite naturally desire the best product they can get, and as a consequence they do not buy material yielding a low margin of profit.

Mica sheet is press-cut to size

Rifting operation requires judgment and care

second operation required before mica becomes salable to the electrical industry, viz., rifting or splitting. Here again the exact size and quality of the books to be rifted must be carefully determined in relation to the existing prices for various grades and qualities of mica.

A word of explanation is required here. The term "grade" in the mica industry refers to the area of a given piece of rifted mica, and specifically to the size of rectangle which may be used therein free from "mechanical" defects such as cracks, foreign mineral crystals, and "cross graining." The term "class" indicates the quality of the mica and pertains to the degree of clarity and amount of stains found in the usable area.

Mica sheets in which the usable area is less than 3 sq in. but more than 1¼ sq in. is termed "punch." "Washer" mica need not satisfy the

The miner in this instance takes the loss.

Industry Integration

It is this situation which has led one mining company to undertake the complete processing of its mica to the ultimate consumer. This is not to say that fabricators generally have treated the mining fraternity unfairly. There has been a noticeable lack of understanding among miners not only about their own costs but about the requirements of fabricators. It is only natural that the miner will have an exaggerated opinion of the value and quality of his own product. This was intensified during the war when it was demonstrated that certain classes of mica previously considered inferior were acceptable for use in most capacitors.

In this connection Bell Telephone Laboratories played an instrumental part by designing a machine to test block mica for power factor. They showed that in some instances heavily-stained mica had a lower power factor than clear mica, although by conventional India standards such mica was commanding a much lower price than it should.

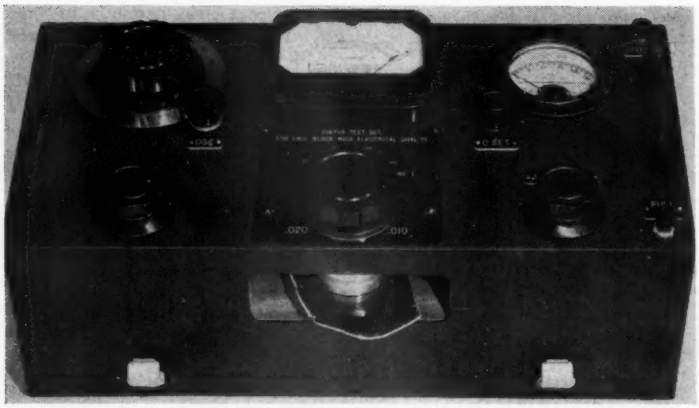
It is regrettable that the quality standards used in the industry have not kept pace with new determinations. This is not entirely the fault of the fabricators. The standards of the ultimate consumers in the electrical industry have not been adjusted as rapidly as they should. In many instances they continue to use a quality of mica which is too costly, and which at the same time consumes mica that should be used only for more exacting requirements. Obviously this tends to decrease domestic reserves of so-called strategic mica.

The attempt of the Custer Mining Account to integrate the mica processes has introduced new problems. For instance, the mining department imposes new demands upon the fabrication department. The first of these is the necessity of marketing all grades and classes mined which are not required by the fabrication department. Unless a large part of the mica mined is marketed immediately in some form, working capital requirements are enlarged.

On the other hand, the needs of the fabrication department may require that mined mica be immediately rifted if only to secure some grade of mica which may constitute a mere 5 per cent or 100 lb of each ton mined. Thus labor costs are added to 95 per cent of the mica mined, which may not be required in the fabrication department for many months. These situations are unique only in the fact that most mica fabricators in this country are accustomed to buying only the grades and classes they require from foreign sources. When they purchase from domestic sources, however, they buy the entire output of all grades. It is difficult for a miner to dispose of his product unless he sells the entire run to the buyer.

The integrated concern attempts to meet these difficulties by marketing individual grades whenever possible, by purchasing foreign mica in those grades in which the fabricating requirements are unusually large, and by limiting mining to the properties whose product can be readily used by the fabrication department.

A typical distribution of sizes from mica mined at one property over a two week period is shown in the table above. The quality of this mica would be classed as No. 3 domestically, heavy stained or poorer by India standards, and would test E2 and E3 on the Bell Telephone Laboratories testing machine.



Mica Q test set developed by Bell Telephone Laboratories evaluates electrical properties of crude mica

Does the $151.28 shown as net below cover mining costs? The answer is sometimes yes and sometimes no. During the past 50 years, with an average mica property, the individual miner has managed to eke out an existence, and there have been numerous instances of exceptional profits. But with the high labor and supply costs of today, new mining methods are urgently needed. An example of the new approach to mining pegmatites is shown by a recent operation of the Lithium Corporation of America, formerly Lor Corporation.

FROM 13,600 LB MINED AND SENT TO RIFTING SHOP

Grade	Pounds	Price	Value	Per cent of Value	Per cent of Weight
1-in. Washer	2460.67	$0.06	$147.64	10.11	18.09
2-in. Washer	2144.75	0.16	343.16	23.49	15.77
3-in. Washer	580.61	0.24	139.35	9.54	4.27
1½ by 2	441.56	0.21	92.73	6.35	3.25
2 by 2	424.18	0.42	178.16	12.20	3.12
2 by 3	396.48	0.52	206.17	14.12	2.92
3 by 3	183.36	0.79	144.85	9.92	1.35
3 by 4	92.18	0.97	89.41	6.12	0.68
3 by 5	64.35	1.20	77.22	5.29	0.47
4 by 5	15.55	1.44	22.39	1.53	0.11
4 by 6	9.12	1.57	14.32	0.98	0.07
6 by 6	0.75	1.73	1.30	0.09	0.01
6 by 8	2.00	1.95	3.90	0.27	0.01
Totals	6815.56		$1460.60	100.01	50.12
Remaining Scrap			67.84		
Total Value			$1528.44		
Cost of Rifting			499.72		
Net after rifting			$1028.72		
Net Value per ton			$151.28		

Improved Mining Methods

The property operated was the White Cap, about 3 miles southeast of Keystone, S. D., a small pegmatite striking northwest southeast for 300 ft. The width averaged about 40 ft, and it was mined to a depth of 120 ft

by an open cut. Before mining operations commenced, 5000 tons of old dump were removed, exposing the southeast end of the lens.

Drilling was done with a Sullivan wagon drill. Sixteen-foot holes were drilled and blasted with caps and fuse and 40 per cent powder. The largest mica books and feldspar crystals were hand picked at the face. The broken ore was then moved by a ¾-yd power shovel into trucks, which hauled it to bins at the mill ½ mile distant. The latter had a connected load of 170 hp, including a 65 hp motor for operating the jaw crusher.

The dump material could have yielded considerable scrap mica had facilities been available at the time for processing it.

Mining costs were $1.05 per ton of rock moved, including the hand sorting at the face. Milling costs were 65¢ per ton of rock handled. In all, 33,000 tons of pegmatite were mined and milled in 11 months yielding 15 tons of beryl, 156 tons of mica, and 13,000 tons of feldspar.

Operations are continuing at the White Cap under another lessee as the Lithium Corp. has recommenced operations on its lithium pegmatite at the mill site.

Economics Govern Processing Method

Improper rifting of mica, however, may easily nullify the gains of improved mining methods, especially in those pegmatites where the mica values are proportionately great. Domestic sheet mica is ordinarily given a half-trim or three-quarter trim after it has been split to the proper thickness. The effect of this trimming is to partially remove cracks, tangled areas, and other imperfections. It also removes much material which could otherwise be used, reducing the weight by approximately 60 per cent. This loss of salable area together with the cost of trimming increases the price paid the miner.

But does this higher price paid for trimmed mica fully compensate the miner for the loss of material and the added labor cost? The writer believes it does not, especially in the integrated concern where effective utilization can be made of the untrimmed mica.

In the table above the cost of rifting and grading the recovered product equaled 7.3¢ per pound. Slightly more than 1629 lb of sheet mica were recovered at a cost of $118.96 with a value of $830.45, leaving a net of $711.49.

Assuming a loss in weight of 60 per cent had the sheet been trimmed, we are left with 651.81 lb of sheet costing $1.00 per pound to trim or $651.81. This figure added to the net recovered in the rifting operation equals $1363.30, or a cost of $2.09 per pound of finished material. Trimmed mica of this class will not average $2.09 per pound in the market.

Mica book in the New Hampshire Mica Co. mine, Alstead, N. H.

If the rifted prices are too high, then the illustration is fallacious. However, these rifted prices are based on the value of mica ultimately contained in the fabricated product. It is reasonable to assume that the trimming process can be eliminated if the mica can be fabricated in the rifted form.

Returning to the table above, further examination shows improper rifting of a kind already described. The cost per pound of rifted mica recovered is seen to be 7.3¢. The 1 in. washer produced constitutes the largest percentage by weight of material produced, and is valued at only 6¢ per pound. Since the cost was 7.3¢ the loss must have been at least 1.3¢ per pound on every pound of 1-in. washer produced. It was actually more. In this instance the number of pieces of 1-in. washer averaged about 60 pieces per pound whereas the other grades averaged from 39 pieces to six pieces per pound. Obviously the 1-in. washer must have cost in excess of 7.3¢ per pound since that figure includes about 82 per cent of the product in which the number of pieces per pound was much lower and the cost of rifting, therefore, was also lower.

Actually on this particular mica the average rifter can handle material producing not more than 50 pieces per pound of rifted stock if he is to break even at 6¢. On small mica the speed and efficiency of the operator introduces an uncertain variable.

One sees that each operation requires careful analysis from the cost angle. For small mines a possible solution would be the use of a custom mill centrally located in the mica-producing area. After any hand picking at the face which proved economical the muck could be moved with an air shovel and trammed to a bin. Thence, it could be trucked to the mill where belt picking, crushing, and screening would recover whatever feldspar, mica, beryl, and other minerals present. The recovery of finely disseminated beryl has not yet been economically solved. Wilfley tables have proved satisfactory in the recovery of tantalite and columbite.

Where the size of the deposits warrants, the installation of a picking belt at the mine has proved highly profitable. But the entire problem needs further experimentation. One thing is certain. Pegmatites should be treated as pegmatites and not as mica mines or feldspar mines. Recovery of all minerals found may make a hitherto submarginal property profitable.

Underground Wiring Maintenance

(*Continued from page* 39)

rails, and between the rails and air or water line.

There are a number of ways in which the bonding may be accomplished. The first and most common is the welding of copper bonds either on the side of the ball or the rail across the joint, or welding a copper bond on the base of the rail beyond the angle bars. The second method is either drilling or punching a hole in the web of the rail beyond the angle bars, and driving in a copper wedge bond. Another method is to weld the ends of the rails together with electricity or acetylene. The latter method has been successful for main line haulage if the welded joints are annealed after welding.

Planned Locomotive Maintenance Assures Freedom from Breakdowns

Haulage locomotives also require definite maintenance schedules. A master list should be given the mine electrician indicating the points to be inspected or lubricated. A checkoff list for each locomotive should be prepared, with the various points to be inspected or lubricated listed, and a space provided to record the date. The condition of the lights, brakes, trolley pole and wiring, motor axle bearing oil, sanders, seat, couplings, safety chains, and trip lamp should be inspected by each motorman at the start of the shift. Once each week the mine electrician should inspect and lubricate the controller, inspect the locomotive grids, traction motor brushes, megger traction motors and wiring, and check over the items that are to be inspected each shift by the motorman. Once each three months, approximately one ounce of good grade ball-and roller-bearing grease should be added to the traction motor and locomotive journal bearings. If a spare locomotive is available a regular servicing plan can be carried on throughout the week but in most cases the servicing will have to be done when the mine is not operating.

A well-planned, maintenance program requires the marking of all switches with tags indicating what equipment they control and what size fuse is required. Some mines provide, in a central location, filled, properly marked, cartridge fuses that may be installed by the shift bosses in the event of trouble when the mine electrician is not available. Where cables of different voltages are used in the same mine, the junction boxes, controls, and motors should be plainly marked. It is found good practice to maintain a one-wire diagram of the mine electrical system showing switches and fuse sizes, and once every three months to go through the mine, checking the fuse sizes, to make sure they agree with the print. Sufficient guards should be provided to prevent persons from contacting live electrical equipment or moving mechanical parts. A periodic check should be made to see that they are in place. Proper electrical fire extinguishers should be installed in the underground substations, pump rooms, and motor barn, and key men instructed as to their proper use.

In order to carry out successfully a good electrical maintenance program all persons concerned must be first sold on the plan, not only the mine electricians, but the captains, foremen, shift bosses, and all other underground employes. This usually requires a continuous educational program and may be accomplished by explaining to these men the general plan and why certain rules must be enforced. If a good maintenance plan is carried out, it will avoid unnecessary accidents due to electrical shock or equipment failure and avoid unnecessary delays in production schedules caused by equipment failure or fire.

Electricians make regular inspection of locomotives in the Godfrey iron mine of the Oliver Iron Mining Co.

San Francisco Program Takes Shape

Active Convention Week Will Set Course of Progress for Metal and Nonmetallic Mining Industry

AT THE 1948 Convention and Exposition at San Francisco the metal and nonmetallic mining industry will get its annual checkup.

Preliminary estimates indicate that this year's convention will draw a record attendance at the program scheduled for the week of September 20 in San Francisco. Mining men from all over the United States will get together to consider national mining problems, to exchange ideas and viewpoints, and to lay coordinated plans for the future of the mining industry.

Reflecting the splendid work of an industry-wide committee, the full program speaks for itself. A careful selection from hundreds of suggestions will bring convention visitors a comprehensive discussion of today's mining problems. Able mining men, consulting engineers, leaders in business and economic fields, government officials, and ranking members of Congress concerned with mining matters will present today's best thinking on vital subjects. Each topic will be explored to the fullest detail to review the current situation and set the future course for greater progress. Ample time will be provided at each session for questions and full discussion of the variety of topics under consideration.

Ten separate sessions make up the program—six devoted to general economic, legislative, and tax matters and four dealing with mine and mill operating problems. Two half days —Tuesday morning and Wednesday afternoon—will be left free for inspection of exhibits and consultation with manufacturers' representatives.

The Exposition provides a unique opportunity for engineering and operating personnel—the men who are responsible for day-to-day performance at the mines—to iron out operating problems that hinge upon the full use of the latest equipment, machines, tools, devices, and mining material. Comprehensive displays will feature rock drills, jumbos, sharpening equipment, hose, drill steels, and all types of drill bits....explosives and blasting accessories....mine car loaders, underground belt conveyors, shaker conveyors....locomotives, mine cars and trackwork....shuttle cars.. .. mine hoists, slusher hoists and scrapers....pumps, air compressors, mine fans and ventilating equipment ....mining ropes and electrical cables ....diesel engines, power transmission units and drive belts....storage batteries....electrical equipment and switchgear .... mill units and electronic controls .... flotation reagents ....feeders, crushers, screens concentrators, tanks and cooling towers.... lubricants....shovels, dragline excavators...safety equipment, and many other mining essentials.

Representatives of exhibitors will be eager to consult with operating men to aid the march of progress of the mining industry. For four full days, from 9 a. m. to 5 p. m., the show will be on for inspection of the displays and for discussion with manfacturers of the application of their products.

Entertainment is planned to round out the active Convention days and provide an opportunity for old and new friends to meet. On Monday noon the welcoming luncheon at the Civic Auditorium will be the first big get-together of Convention week. At the mining jamboree on Monday night a buffet dinner will be followed by a full evening of continuous entertainment and dancing.

Wednesday night there will be a repeat performance of the boat ride held at the 1941 Convention. Aboard the huge ferry, Sierra Nevada, convention visitors will cruise San Francisco Bay and enjoy a box supper, dancing, boxing matches, and other entertainment.

Celebrating the Golden Anniversary of the American Mining Congress and California's Golden Centennial, the annual banquet on Thursday night will be held at the Palace Hotel's Garden Court. Following the dinner honoring Mining Congress' leaders of this and other years, Warren Whitney, a speaker well-known for his unusual ability to mix the right amount of humor with seriousness, will give a short talk on Americanism. Two orchestras will enliven the dancing hours and a real floor show will be featured.

Although the ladies are invited to all convention functions, some special occasions are planned for them that will take place while the men are busy attending convention sessions. On Tuesday an outing will take the

(Continued on page 67)

Golden Gate bridge—vital link in California's development

Advance Program

Metal Convention

Western Division

American Mining Congress

SUNDAY, SEPTEMBER 19—ADVANCE REGISTRATION: 1 p.m. to 4 p.m.
Mining Men and Ladies—Palace and Fairmont Hotels
Exhibitors and all other Manufacturers—Civic Auditorium

Monday, September 20

9:40 a.m. PRE-SESSION MOTION PICTURE

10:00 a.m. FIRST GENERAL SESSION—GOVERNMENT POLICIES AND THE MINING INDUSTRY, Polk Hall, Civic Auditorium

Opening of Convention

JULIAN D. CONOVER, *Secretary*, American Mining Congress

Chairman: HOWARD I. YOUNG, *Pres.*, American Zinc, Lead & Smelting Co., St. Louis, Mo.; *Pres.*, American Mining Congress

Impact of the Rearmament and Industrial Mobilization Program on the Mining Industry

MAJOR GENERAL C. F. ROBINSON, *Executive Officer, National Security Resources Board*

Impact of the Foreign Aid Program on the Mining Industry

EVAN JUST, *Director, Strategic Materials Division, Economic Cooperation Administration*

Discussion of the Industry's Viewpoint on Mobilization

Bureaucratic Obstacles to a Prosperous Mining Industry

P. R. BRADLEY, JR., *Pres.*, Pacific Mining Co., San Francisco

Reciprocal Trade Agreements—Their Effect on Mining

HON. GEORGE W. MALONE, U. S. Senator from Nevada

Discussion: CHARLES H. DUNNING, *Dir.*, Arizona Dept. of Mineral Resources, Phoenix, Ariz.

12:30 p.m. WELCOMING LUNCHEON, Larkin Hall, Civic Auditorium

2:30 p.m. SECOND GENERAL SESSION—FUTURE OF GOLD AND OTHER METALS, Polk Hall, Civic Auditorium

Chairman: ROBERT M. HARDY, *Pres.*, Sunshine Mining Co., Yakima, Wash.

Outlook for Silver and the Non-Ferrous Metals

SIMON D. STRAUSS, *Mgr. of Sales*, American Smelting & Refining Co., New York

Status of the Strategic Metals Industries

SAMUEL H. WILLISTON, *Vice-Pres.*, Cordero Mining Co., San Francisco

The Outlook for Gold in an Inflationary Era

ROBERT W. BACHELOR, *Dir. of Research Council*, The American Bankers Association, New York

Restoring Private Ownership and an Open Market for Gold

HON. PAT MCCARRAN, *U. S. Senator from Nevada*

The British Empire Viewpoint on Gold

DR. PAUL EINZIG, *Economist*, London, England

2:30 p.m. FIRST OPERATING SESSION—ADVANCES IN MILLING PRACTICE, Second Floor Meeting Room, Civic Auditorium

Co-chairmen: JOHN F. MYERS, *Mill Supt.*, Tennessee Copper Co., Copperhill, Tenn.
F. M. JARDINE, *Mill Supt.*, Nevada Mines Div., Kennecott Copper Corp., McGill, Nev.

Recent Advances in Milling Practice

W. L. ZEIGLER, *Gen. Mgr.*, Pend Oreille Mines & Metals Co., Metaline Falls, Wash.

Symposium on Fine Grinding

A. W. FAHRENWALD, *Dean*, School of Mines, University of Idaho, Moscow, Idaho

FRED C. BOND., *Dir.*, Basic Industries Laboratory, Allis-Chalmers Mfg. Co., Milwaukee, Wis.
HOWARD M. ZOERB, *Chief Engr.*, Crusher Div., Nordberg Mfg. Co., Milwaukee, Wis.

Instrumentation and Automatic Control of Milling Plants

I. M. LEBARON, *Chief*, Ore Dressing Dept., International Minerals & Chemical Corp., Mulberry, Fla.

Discussion: C. M. MARQUARDT, *Electronic Engr.*, Combined Metals Reduction Co., Salt Lake City
R. E. BYLER, *Vice Pres.*, The Merrill Co., San Francisco

Tuesday, September 21

MORNING: OPEN—to afford ample opportunity for inspection and study of the exhibits

1:40 p.m. PRE-SESSION MOTION PICTURES

2:00 p.m. THIRD GENERAL SESSION—PROBLEMS UNDER CONSIDERATION BY THE NATIONAL MINERALS ADVISORY COUNCIL, Polk Hall, Civic Auditorium

Chairman: DONALD H. MCLAUGHLIN, *Pres.*, Homestake Mining Co., San Francisco; Chairman, National Minerals Advisory Council

Work of the National Minerals Advisory Council

JAMES BOYD, *Director*, U. S. Bureau of Mines

Premium Price and Subsidies . . . Marginal Deposits . . . Stockpiles . . . Exploration and Development Incentives

Discussion led by following members of the Council's subcommittees which have been studying these subjects:

SAMUEL H. WILLISTON, *Vice-Pres.*, Cordero Mining Co., San Francisco

O. W. BILHARZ, *Pres.*, Bilharz Mining Co., Baxter Springs, Kans.

R. H. PAGE, *Pres.*, Phelps Dodge Corp., New York

E. R. LOVELL, *Pres.*, Calumet & Hecla Consolidated Copper Co., Calumet, Mich.

WORTHEN BRADLEY, *Pres.*, Bradley Mining Co., San Francisco

E. H. SNYDER, *Pres.*, Combined Metals Reduction Co., Salt Lake City

HOWARD I. YOUNG, *Pres.*, American Zinc, Lead & Smelting Co., St. Louis

Public Lands

CHARLES F. WILLIS, *State Secy.*, Arizona Small Mine Operators Assn., Phoenix, Ariz.; Chairman of the Council's Subcommittee on Public Lands

Open Discussion From the Floor

2:00 p.m. SECOND OPERATING SESSION—MECHANIZATION OF MINING OPERATIONS, Larkin Hall, Civic Auditorium

Chairman: R. J. MECHIN, *Div. Mgr.*, St. Joseph Lead Co., Balmat, N. Y.

Progress in Mechanization of Metal and Nonmetallic Mines

E. R. BORCHERDT, *Research Engr.*, Anaconda Copper Mining Co., Butte, Mont.

Discussion: S. S. CLARKE, *Gen. Mines Supt.*, Eagle-Picher Mining & Smelting Co., Miami, Okla.
D. I. HAYES, *Western Mgr.*, American Zinc, Lead & Smelting Co., Spokane, Wash.

Experience in the Use of Tungsten Carbide Insert Bits

BLAIR BURWELL, *Pres.*, Mineral Engineering Co., Grand Junction, Colo.

Discussion: JOSEPH H. TAYLOR, *Vice-Pres.*, Peru Mining Co., Silver City, N. Mex.

WILLIAM J. LOACH, *Mgr.*, Wolf Tongue Mine, Boulder, Colo.

High Speed Rock-Tunnel Driving by the Pacific Gas and Electric Co., on the Mokelumne and Feather Rivers

H. W. HABERKORN, *Engr. of Hydroelectric Construction*, and J. E. COONEY, *Project Mgr.*, Pacific Gas & Electric Co., San Francisco

Discussion: A. H. BEBEE, *Vice Pres.*, Golden Cycle Corp., Colorado Springs, Colo.

Wednesday, September 22

9:40 a.m. PRE-SESSION MOTION PICTURES

10:00 a.m. FOURTH GENERAL SESSION—LABOR RELATIONS—MANPOWER PROBLEMS, Polk Hall, Civic Auditorium

Chairman: J. C. KINNEAR, *Vice Pres.*, Kennecott Copper Corp., McGill, Nev.

Experience under the Taft-Hartley Law—What Further Legislation Is Needed?

HON. RICHARD M. NIXON of California; Member, Committee on Education and Labor, U. S. House of Representatives

Maintaining Industrial Peace—Handling of Labor Disputes

CYRUS S. CHING, *Dir.*, Federal Mediation and Conciliation Service; former Director, Industrial Relations, U. S. Rubber Co.

Personnel, Safety and Public Relations Problems of the Mining Industry

W. ERNEST JONES, *Personnel Dir.*, Climax Molybdenum Co., Climax, Colo.

Discussion: Attracting Men to the Mining Industry

BYRON E. GRANT, *Gen. Supt.*, U. S. and Lark Mines, U. S. Smelting Refining & Mining Co., Bingham Canyon, Utah

10:00 a.m. THIRD OPERATING SESSION—OPEN PIT AND PLACER MINING, Larkin Hall, Civic Auditorium

Chairman: W. C. BROWNING, *Gen. Mgr.*, Golden Queen Mining Co., Los Angeles

Factors Affecting Adoption of Open Pit Methods at Inspiration, Ray and Bagdad, Ariz.

A. E. MILLAR, Inspiration Consolidated Copper Co., Inspiration, Ariz.

Discussion: W. H. GOODRICH, *Gen. Mgr.*, Chino Mines Div., Kennecott Copper Corp., Hurley, N. Mex.

Large-Scale Stripping With Dragline-Conveyor Belt Combination

(To be announced)

Gold Dredging Practices and Problems

H. A. SAWIN, Yuba Consolidated Gold Fields, San Francisco

Discussion: R. P. PORTER, *Pres.*, Porter Brothers Corp., Spokane, Wash.

NOON: *Special Luncheons*—Tax Committee, Strategic Minerals Committee, etc., including possibly a round-table discussion on Use and Occupancy Insurance

AFTERNOON: OPEN—to afford ample opportunity for inspection and study of the exhibits

Thursday, September 23

9:40 a.m. PRE-SESSION MOTION PICTURES

10:00 a.m. FIFTH GENERAL SESSION—TAX—TRAFFIC—NON-METALLIC MINERALS, Polk Hall, Civic Auditorium

Co-Chairmen: HENRY B. FERNALD, *Chairman*, AMC Tax Committee

LOUIS WARE, *Pres.*, International Minerals & Chemical Corp., Chicago, Ill.

Symposium on Tax Problems of the Mining Industry

The General Outlook for Taxes

ELLSWORTH C. ALVORD, *Tax Counsel*, American Mining Congress

Administrative Amendments Needed

ARTHUR H. KENT, *Atty.-at-Law*, San Francisco

Removing Tax Deterrents to Mining Investment, Exploration and Development

STANLY A. EASTON, *Pres.*, Bunker Hill & Sullivan Mng. & Conc. Co., Kellogg, Ida.

H. C. JACKSON, *Partner*, Pickands Mather & Co., Cleveland

B. T. POXSON, *Chr.*, Emperius Mining Co., Creede, Colo.; *Pres.*, Colorado Mining Assn.

HARVEY S. MUDD, *Pres.*, Cyprus Mines Corp., Los Angeles

Traffic Problems of the Mining Industry

OSCAR W. TUCKWOOD, *Gen. Traffic Mgr.*, American Smelting & Refining Co., New York

Nonmetallic Minerals of the West

HENRY MULRYAN, *Exec. Vice Pres. and Gen. Mgr.*, Sierra Talc & Clay Co., Los Angeles

10:00 a.m. FOURTH OPERATING SESSION—MINE OPERATING PROBLEMS, Larkin Hall, Civic Auditorium

The "Greater Butte Project"—Prospecting and Sampling; Block-Caving Tests

CHESTER H. STEELE, *Mines Geol.*, Anaconda Copper Mining Co., Butte, Mont.

Discussion: CHARLES E. SCHWAB, *Mng. Engr.*, Bunker Hill & Sullivan Mng. & Conc. Co., Kellogg, Ida.

Shaft-Sinking in the Coeur d'Alene District

RALPH NEYMAN, *Mine Supt.*, Hecla Mining Co., Wallace, Ida., and R. W. LOTTRIDGE, *Gen. Supt.*, Federal Mining & Smelting Co., Wallace, Ida.

Discussion: CLARK L. WILSON, *Engr.*, New Park Mining Co., Keetley, Utah

J. MURRAY RIDDELL, Michigan College of Mining & Technology, Houghton, Mich.

Development and Mining of the San Manuel Orebody

WESLEY P. GOSS, *Gen. Mgr.*, Magma Copper Co., Superior, Ariz.

2:00 p.m. SIXTH GENERAL SESSION—ADDING TO ORE RESERVES, Polk Hall, Civic Auditorium

Chairman: IRA B. JORALEMON, *Consulting Engr., San* Francisco

Results of Recent Exploration and Development in Adding to Ore Reserves

Northwest:

CARLTON D. HULIN, *Associate Professor of Geology*, University of California, Berkeley

Southwest:

E. N. PENNEBAKER, *Consulting Geol.*, Consolidated Coppermines Corp., Globe, Ariz.

Intermountain:

RICHARD N. HUNT, *Chief Geol.*, U. S. Smelting, Refining & Mining Co., Salt Lake City

Mississippi Valley and Eastern:

FRANK CAMERON, *Vice-Pres.*, St. Joseph Lead Co., New York

Western Hemisphere Iron Ore:

FRANKLIN G. PARDEE, *Appraiser*, Michigan State Tax Commission, Lansing, Mich.

Cooperative Programs of Geologic Mapping

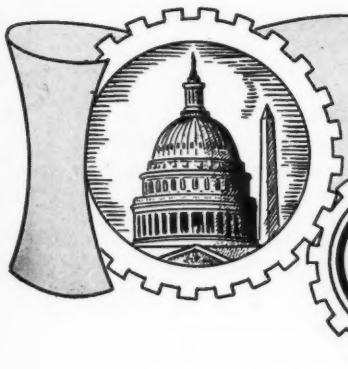
OLAF JENKINS, *Head*, California State Division of Mines, San Francisco

Atomic Energy Minerals—Prospecting—Production—Governmental Policies

JOHN K. GUSTAFSON, *Dir., Division of Raw Materials*, U. S. Atomic Energy Commission

Report of Resolutions Committee

7:30 p.m. GOLDEN ANNIVERSARY BANQUET, Garden Court, Palace Hotel



WHEELS OF GOVERNMENT

As Viewed by A. W. DICKINSON of the American Mining Congress.

SHARP criticism from majority party members of Congress and from many minority members has been directed at the President's call for the special session of Congress which convened July 26th. It is expected that the White House will urge passage of a housing bill, stand-by price and rationing controls, "civil rights" legislation, broadened Social Security coverage, a higher minimum wage, an expanded Federal power program, and Federal aid to education. The anti-poll tax, anti-lynching, and Fair Employment Practices Commission bills can be brought up for Senate floor action at any time and will, beyond question, result in prolonged debate. Conjectures as to the length of the special session run from two to three weeks.

Because the special session is coincident with the current election campaign, close attention of observers and participants is being directed to the political platforms of the two major parties. Points of interest in the Republican platform are the declarations for the development of the West; reduction of Government costs; stimulation of production to bring about lower prices; adoption of fiscal policies designed to increase production and thrift; a sound currency; reduction of the public debt; abolition of overlapping, duplication, extravagance, and excessive centralization in management of the Government; reduction in taxation to provide incentives for creation of new industries and new jobs and to bring relief from inflation; continued study to improve labor-management legislation in the light of experience and changing conditions; conservation of all natural resources, with the statement that "conservation and stockpiling of strategic and critical raw materials is indispensable to the security of the United States"; withdrawal or acquisition of lands for public purposes to be made only by Act of Congress and after due consideration of local problems; development of processes for extraction of oil and other substances from oil shale and coal; adequate representation of the West in the national administration, and support of reciprocal trade while "at all times safeguarding our own industry and agriculture."

Included in the Democratic platform are declarations for development of a "positive program to promote competitive business and to foster the development of independent trade and commerce"; strengthening and more intensive enforcement of the anti-trust laws; adoption of "civil rights" legislation; restoration of the reciprocal trade agreements program as it existed in 1934; imposition of inflation controls; maintenance of "sound fiscal policies"; "reduction of taxes, whenever it is possible to do so without unbalancing the Nation's economy, by giving a full measure of relief . . . to low-income families"; removal of tax inequities and reduction of the public debt; repeal of the Taft-Hartley Act and adoption of legislation "to establish a just body of rules to assure free and effective collective bargaining, to determine in the public interest, the rights of employes and employers, to reduce to a minimum their conflict of interests, and to enable unions to keep their membership free from Communistic influences"; restoration of the Federal Mediation and Conciliation Service and the USES to the Labor Department; extension of the coverage of the Fair Labor Standards Act and the adoption of a 75¢ an hour minimum wage; extension of the Social Security program with more liberal benefits; "continued thorough and unified regional development of the water, mineral, and other natural resources of the Nation"; acceleration of the reclamation program; stockpiling of strategic minerals and encouragement of a sound domestic mining industry; and carrying forward experiments for the broader utilization of mineral resources.

Washington Highlights

CONGRESS: Recalled in special session.
STOCKPILING: Granted $600,000,000.
STEEL: Mining industry needs computed.
ANTHRACITE: New wage contract.
CAPTIVE COAL MINES: Strike ends.
WAGE-HOUR: Overtime-on-Overtime interpretation.
TIDELANDS: Supreme Court to get report.
ST. LAWRENCE: Issue revived?

Stockpiling

An appropriation of $600,000,000 for stockpiling of strategic and critical materials in the current fiscal year assures action on this Munitions Board and Treasury program for the near future. The Munitions Board is pressing to accomplish the transfer of RFC's present stockpile to the national defense stockpile. The Department of Commerce and the Munitions Board have discussed a system of voluntary agreements to aid in stockpiling nonferrous metals, through which a part of current production would go to the stockpile. In addition there are plans for the making of long-term contracts for needed metals and minerals at current prices, and the bringing in of foreign ores and metals under the ECA's foreign aid program.

Steel Requirements

While the President has declared his belief that it will not be necessary to require mandatory steel allocations to supply the requirements of the armed forces, he has stated that he will use the powers given him in the Draft Act to allocate steel in the event

such a procedure should become necessary. Such mandatory authority, he said, would be exercised by the Secretary of Defense.

Meanwhile, Interior Secretary Krug has requested the Office of Industry Cooperation in the Department of Commerce to allocate as much steel as may be essential for maintaining coal production at an adequate level. Krug submitted a report by the National Bituminous Coal Advisory Council estimating steel requirements for the bituminous coal industry at 682,900 tons annually, based on an anticipated output of 620,000,000 tons of bituminous coal a year. The need for mine machinery and repair parts was set at 306,700 tons of steel, with 376,200 tons required for underground and strip coal-mining supplies. The estimate of steel requirements for the anthracite industry was set at 74,300 tons annually, and for the coal mining machinery program of ECA at 77,250 tons.

The Council further submitted as a guide the 1943 steel requirements for metal mines and smelters and nonmetallic mines; steel for maintenance, repairs, and operating supplies for metal mines and smelters—141,850 tons; steel used in metal-mining machinery and smelting equipment—73,815 tons; steel used for maintenance, repairs, and operating supplies by nonmetallic mines—87,370 tons; and steel used for nonmetallic mining machinery—23,798 tons. These are all 1943 figures, from which estimated needs for 1949 are to be developed.

Anthracite Contract

Effective July 16, a new anthracite region wage agreement granted a wage increase of $1.00 per day and raised the welfare fund royalty from 10¢ to 20¢ per ton. The contract grants a $100 vacation payment with the 1949 vacation period running from June 25 to July 5.

In the contract the beneficiaries of the welfare fund are described as "members of the United Mine Workers," a wording which, according to UMWA officials, will make the fund apply to union members who might not actually be working at the time they become eligible for benefits.

Coal Captives

Although, as reported last month, the Bituminous Coal Mine Joint Wage Conference came to an agreement on June 25, the captive coal-mine operators refused to sign, stating that, "The contract proposed by these Unions contains a union shop provision in violation of the law of the land." These operators also stated that, "Counsel has advised that acceptance of the contract in the form now demanded by the union would constitute a violation of the Taft-Hartley Act."

The miners of the captive mines did not return to work on July 6 at the end of their vacation and it was not until after the conditional signing of the contract by the captive operators and the miners' representatives on July 13 that the mines resumed operation. Meanwhile the captive mine owners filed a formal complaint with the National Labor Relations Board, charging that the UMWA had refused to bargain unless the new contract contained the union-shop provisions, and that an attempt was thus being made to cause the operators to discriminate against their employes by insisting that they join the union.

The NLRB then went into Judge Goldsborough's Federal District Court and requested an injunction to halt the strike. Judge Goldsborough ordered John Lewis to appear July 14, but a compromise was reached on July 13 under which the contract was signed. The compromise settlement consisted of a stipulation which becomes part of the contract, providing that the legality of the union shop clause shall be left to final decision by the NLRB and the courts, and, if necessary, modified to the extent required to accord with the last court's decision. Following the adoption of this compromise the NLRB returned to Judge Goldsborough's court and asked and was permitted to withdraw the Board's petition for an injunction. On July 22, the NLRB began hearings on the captive mine owners' complaint. NLRB General Counsel Denham argued that the mine owners were justified in their position. Lewis and the UMWA, through their attorneys, asked dismissal of the complaint and Board action is expected shortly.

Overtime-on-Overtime

The Wage-Hour Administrator has issued a new interpretation, effective September 15, covering the computation of overtime compensation, where premium payments are made for work on Saturdays, Sundays, holidays or at night.

Under the interpretation the Fair Labor Standards Act requires the inclusion in an employe's regular rate of premium payments for work on Saturdays, Sundays, holidays, or at night, as such, which are made without regard to the number of hours or days previously worked by the employe in the day or workweek; and such premium payments may not be offset against the statutory overtime compensation due for work in excess of 40 hours in the workweek. The Administrator explains, however, that if the extra payments are contingent upon the employes' having previously worked a specified number of hours or days "according to a bona fide standard," such premium payments will, under the Supreme Court's decision, be regarded as true overtime premiums which need not be included in the regular rate and may be offset against the statutory overtime compensation due under the Act. The Administrator asserted the premium pay for work on the sixth and seventh days worked in the workweek would be regarded as an overtime premium when paid by reason of that fact, even though an applicable contract must also contain a provision calling for premium payments for work on those particular days, as such.

The Administrator further stated, "In determining whether payments to an employe at an increased rate for Saturday, Sunday, holiday or night work are made for time worked in excess of a bona fide standard or, on the other hand, simply because such periods are less desirable for the performance of work, the Division will look not only at the terms of the applicable contract but also at the actual practice of the parties under the contract. The mere fact that a contract calls for premium payments for work on Saturdays, Sundays, holidays, or at night would not necessarily prove that the higher rate is paid merely because of undesirable working hours if, as a matter of fact, the actual practice of the parties shows that the payments are made because the employes have previously worked a specified number of hours or days, according to a bona fide standard."

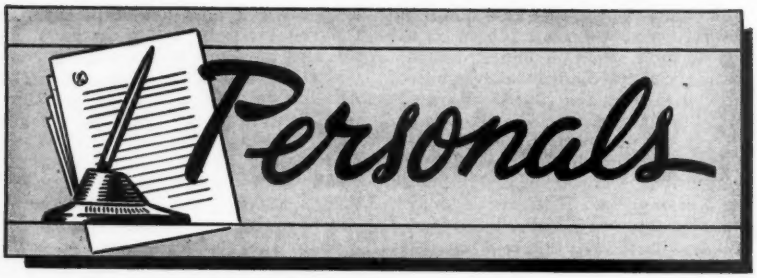
It should be borne in mind that on June 21 the Department of Justice asked the Supreme Court to reconsider its ruling of June 7 in the case of the New York longshoremen, stating that the ruling "is not only erroneous, but its application will be virtually impossible in some industries."

Submerged Lands

Because the proponents of the submerged lands bill, S. 1988, which would vest title to such lands in the States, did not wish to risk a White House veto, there was no further action on the bill in the recent congressional session. The measure had been reported by the Senate Judiciary Committee and was on the calendar. It will be remembered that it contains amendments to protect the holders of mining claims on the public domain.

Revive St. Lawrence Issue?

There are definite indications that the advocates of the Great Lakes-St. Lawrence Waterway and Power project intend to bring this controversial issue before the 81st Congress. Under the chairmanship of Senator Wiley of Wisconsin, a Foreign Relations subcommittee is slated to make further studies of the project and to render a report early in 1949. In addition to the chairman, the subcommittee consists of Senators Smith of New Jersey, Hickenlooper of Iowa, Thomas of Utah, and Barkley of Kentucky.



O. P. Chisholm, superintendent of the East Helena plant of the A. S. & R. Co. since January 1, 1932, retired on June 30 after more than 35 years of service. **Joseph T. Roy** will succeed Mr. Chisholm as superintendent. Frank C. Moran, who has been in the East Helena plant since 1933, has been appointed assistant superintendent.

Raymond E. Zimmerman has resigned his position as preparation manager of the Hanna Coal Co. to accept a professorship at Penn State where he will be chief of the mineral preparation division of the School of Mineral Industries. Prior to taking up his new duties he will spend approximately two months in Europe and Turkey where he will make a study of the coal fields of Turkey for purposes of determining their preparation characteristics, under an agreement between the Turkish Government and the McNally-Pittsburg Mfg. Corp.

John E. Thompson, formerly superintendent of the No. 30 Mine of Black Mountain Corp., Kenvir, Ky., has been promoted to division superintendent in charge of mines No. 30 and 31. **Homer Crank**, formerly manager of No. 30 Mine, has been promoted to superintendent succeeding Mr. Thompson. **George Ledford**, formerly assistant mine manager, has been made manager of No. 30 Mine.

Alexander Jack has been appointed vice-president in charge of operations of the Pennsylvania Coal and Coke Corp. **Thomas L. Aitken** has been appointed general manager.

James H. Morley, who has been general superintendent for the American Rutile Co. for more than 25 years, has been named vice-president and director.

Dr. **Samuel Goldich** of the Texas Bureau of Economic Geology and the U. S. Geological Survey has accepted a position as Associate Professor of Petrography and Petrology in the Department of Geology at the University of Minnesota. This position was recently vacated upon the retirement of Dr. **F. F. Grout.**

Claude P. Heiner has been promoted to the position as president and general manager of the Utah Fuel Co., following the death of Moroni Heiner, the former president. **Herbert A. Snow**, has been advanced to the position of senior vice-president.

Evan F. Wilson of Akron, O., has been appointed assistant director of the Division of Raw Materials of the Atomic Energy Commission. He will be responsible for the research program of the division which is concerned with the development of extracting uranium from low grade domestic sources. His headquarters will be at the Commission's New York office, 70 Columbus Ave., New York.

D. A. Merson and **Harry C. Wildner** have been elected vice presidents of the National Lead Co. according to a recent announcement by **J. A. Martino**, president.

La Mar S. Hills has been appointed assistant superintendent of the mills ore haulage department of the Kennecott Copper Corp., Utah copper division.

Arnold H. Miller, consulting engineer, has moved his office to 120 Broadway, New York.

P. George Maercky was recently elected a vice-president of Texas Gulf Sulphur Co., according to a recent announcement from Walter H. Aldridge, president.

C. R. Nailler, vice-president, Consolidation Coal Co. at Pursglove, W. Va., was recently elected president of the Monongahela Valley Coal Mining Institute.

Seton S. Williams, assistant to Theodore A. Dodge, consulting mining geologist, has opened an office in Tucson, Ariz., and plans to specialize in service to the small mines of the state. His field experience includes three years with the engineering department of the Copper Queen Branch of Phelps Dodge Corp. and special work on mine dust conditions for the Arizona Department of Mineral Resources.

E. H. Reichl has been promoted to the position of manager of the research department of the research and development division of Pittsburgh Consolidation Coal Co. Mr. Reichl has been with the company since January 1948 as chief process engineer of the development department.

J. O. Winston, Jr. of Houston, Tex., has been elected a member of the board of directors of Freeport Sulphur Co.

Winthrop Neilson, secretary and director of Alcoa Mining Co., resigned his position July 15.

A. D. Sisk, who was formerly safety director for the Big Sandy-Elkhorn Coal Operators and secretary of the Big Sandy-Elkhorn Mining Institute and the Kentucky Mining Institute, has been appointed chief of the Department of Mines and Minerals of Kentucky, succeeding **Harry Thomas** who recently resigned.

C. L. Bradbury, Albuquerque, N. M., is now operating a gold mine in Mexico, the Cia Minera Del Mexcala, S. A., located in the State of Guerrero in the new San Pedro Mining District. A 400-ton cyanide mill is to be built and other new equipment installed.

C. A. Fredell has resigned his position as manager of the mining division for E. J. Longyear Co. to accept the position of manager of Cia. Minera Venturosa, S. A., located at Namiquipa, Chihuahua, Mexico. He will begin his new duties on August 1.

T. G. Jordan has been elected president of the Maryland New River Coal Co., Maryland Fire Creek Coal Co., and Maryland Trojan Coal Co.

Robert J. Bonnemort, formerly chief engineer for the Balatoc Mining Co., Baguio, P. I., is now in charge of engineering for the reorganized Silver King Divide Mining Co., Austin, Nev.

A. T. Patterson has been promoted to the position of assistant to the general manager of mines of the Lorado Mining Co. He will be in direct charge of work above ground under the direction of **L. F. Workman**, general manager of mines.

Francis W. Sheppard, formerly general sales manager of Harbison-Walker Refractories Co., Pittsburgh, Pa., became vice president in charge of sales of Woodward Iron Co., Woodward, Ala., on July 1. He succeeds **John B. DeWolf** who recently retired.

August 10 was the birthday of **Herbert C. Hoover**, only living ex-President. Mr. Hoover, on his 74th anniversary, continues to be actively interested in the mining industry in addition to his important activities in world affairs.

A. Norman Into and **Maurice H. Lockwood** were recently elected vice-presidents of the International Minerals & Chemical Corp.

J. N. Geyer was recently appointed production engineer for the Imperial Coal Corp. with headquarters in Johntown, Pa. For the past 15 years Mr. Geyer has been connected with the Central Pennsylvania Coal Producers Association at Altoona, Pa., as a mining engineer, later a technical advisor, and recently as assistant secretary.

Robert S. Lewis, professor and head of the Department of Mining Engineering at the University of Utah, has been retired with the title of Professor Emeritus. He came to the University of Utah in 1912, after several years of experience in the mining field. He is the author of the book "Elements of Mining;" section on "Boring" in Peele's Mining Engineers handbook, article on Mining in the Encyclopaedia Britannica, and over 50 articles in the technical press. His address is 1923 East Third South Street, Salt Lake City 1, Utah.

George W. Kratz, vice-president, Pittsburgh Consolidation Coal Co., has been elected a director of the company to fill the vacancy created by the recent death of Barton P. Turnbull.

E. L. Klingler has been appointed assistant wire rope sales manager for **The Colorado Fuel and Iron Corp.** He will continue supervision of the expanded sales engineering force in addition to acting as assistant to A. S. Rairden, wire rope sales manager of the corporation.

Harry J. Wolf, of Behre Dolbear & Co., examined gold mining properties north of Miramar de Puntarenas, in Costa Rica, during June.

— *Obituaries* —

Dr. Rolland Craten ("Bill") Allen, prominent business executive in the iron ore, coal, and shipping industries, and nationally known geologist and mining engineer, died July 18, 1948, in Cleveland, Ohio, at the age of 67.

Dr. Allen was chairman of the board of the Reserve Mining Co.; Lake Superior Land Company and Northern Land Co. He was a director of the Ferro Engineering Co.; Montreal Mining Co.; and Standard Box Co. He was executive vice-president and director of Oglebay Norton and Co.; Atwater Dock Co.; Brule Smokeless Coal Co.; the Saginaw Dock and Terminal Co.; and the Toledo, Lorain & Fairport Dock Co.

He was successively vice-president and president of the Lake Superior Iron Ore Association from 1919 to 1948. He was president and trustee of Battelle Memorial Institute, Columbus, O., and trustee of Western Reserve Academy, Hudson, Ohio.

Dr. Allen was president of the American Institute of Mining and Metallurgical Engineers in 1937. He was active for many years in the work of the American Mining Congress, and was also a member of the Society of Economic Geologists; Geological Society of America; Mining and Metallurgical Society of America; American Iron & Steel Institute; American Academy of Political Science; and Cleveland Engineering Society.

In World War II he served as deputy chief, Iron and Steel Branch of the War Production Board and as vice chairman of the Metals and Minerals Division of the Board. In World War I he was a member of the initial War Profits and Excess Profits Board of the Treasury Department. In that capacity he organized the Division of Natural Resources and became its first chief.

The mining industry of the Nation and the men who compose it will miss "Bill." He was a staunch American, hard working, able, and true as steel. In the recent war his four sons were in the armed services. To the many calls made upon him for his services by the industry and the nation, in peace and war, his response was quick and strong, and he gave generously of his ability, wisdom, and strength to make this country a better place for those who are here and for those who will follow.

Dr. Allen is survived by Mrs. Allen, a daughter, four sons, and eight grandchildren.

Wm. M. Pryor, vice-president of the Red Jacket Coal Corp. died in June. Mr. Pryor had been identified with both the coal and lumber industries for a number of years.

Thomas Bealle Davis, 74, of New York City and Middleburg, Va., chairman of the boards of directors of the Island Creek Coal Co. and the Pond Creek Pocahontas Co., died of a heart attack Saturday afternoon, July 3. Mr. Davis was born December 13, 1875, at Piedmont, W. Va.

Mr. Davis entered upon his career in the bituminous coal industry following his graduation from Sheffield Scientific School, Yale University, in 1897. During the next 10 years he was associated with the Somerset Coal Co., Fairmont Coal Co., Consolidation Coal Co., and Davis Coal and Coke Co. In 1907 he became vice-president of the United States Coal and Oil Co. and Island Creek Coal Sales Co., which in 1910 were merged into the Island Creek Coal Co. He became president in 1913 and chairman of the board in 1934. Under his charge the properties of the Island Creek have increased from an annual production of 700,000 tons with 28,000 acres of coal reserves to their present status as a leading producer with 130,000 acres of coal reserves.

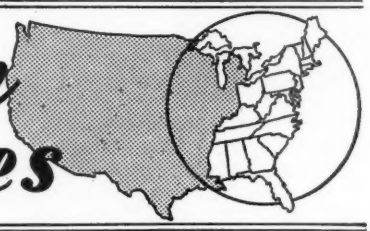
Mr. Davis was always particularly interested in employe relationships and in building up mining communities with high standards of living conditions, including schools, churches, and good roads. The encouragement of safe working conditions in the mines had his constant attention.

J. D. Deshotels, Sr., chief operating engineer in the power house of Texas Gulf Sulphur Co., at Newgulf, died suddenly of a heart attack at his home in Newgulf, on July 22, 1948.

"Doug," as he was affectionately known by his many friends, was born April 23, 1886, in Washington, La., and was employed by Texas Gulf at Gulf, Tex., their first mine location, in 1918. He was transferred to the Newgulf mine in 1937, following the exhaustion of the Gulf mine.

NEWS and VIEWS

Eastern States



Harrington Receives Joseph A. Holmes Award

On July 13 Daniel Harrington, retired chief of the Health and Safety Division of the Bureau of Mines, was presented a special safety medal and certificate of honor by the Joseph A. Holmes Safety Association. The award was presented by James Boyd, director of the Bureau of Mines and president of the Association, in recognition of Mr. Harrington's more than 40 years' service in the promotion of health and safety in the mineral and allied industries.

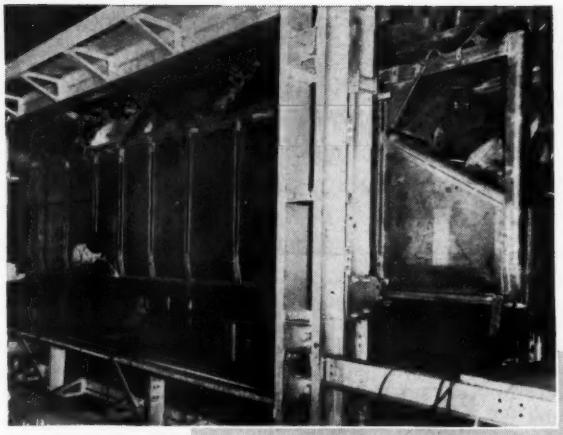
For more than 22 years Mr. Harrington served as secretary of the Holmes Safety Association, and during this period reviewed many thousands of safety achievements in the selection of the Association's annual safety awards. Since the formation of this group in 1916, by representatives of 26 leading national organizations representing the mining, metallurgical, and allied industries, only two other individuals were singled out for the type of special award presented to Mr. Harrington. Previous recipients were George S. Rice, retired Bureau of Mines engineer, who was honored in 1946; and A. J. R. Curtis, safety director of the Portland Cement Association, who received the award in 1947.

The award to Mr. Harrington was proposed during the 1948 annual meeting of the board of directors of the Association, who also elected Mr. Harrington to honorary life membership on the board. In accepting the award, Mr. Harrington stated: "Safety has been my life's work and this organization has been my 'baby.' This award is the zenith of my life at the present time. Others may not realize what the award means to me. I have seen the value placed on these awards by others, but I think I place more value upon the award than anyone else could do."

The certificate of honor accompanying the bronze metal was inscribed: "Daniel Harrington, whose unselfish personal devotion to and leadership in the cause of safety in the mineral industries for a period of more than four decades, has resulted in continuous advancement toward the goal of accident-free operation. He carries with him in his retirement the heartfelt and gracious thanks of all the extractive industries."

Members of the Association's board of directors attending the presentation ceremonies were Director Boyd; Mr. Harrington; A. W. Dickinson, American Mining Congress, member-at-large; Harry Gandy, Jr.; and Earl R. Maize, National Coal Association; M. J. Ankeny, Bureau of Mines and secretary of Holmes safety chapters; J. J. Forbes, new chief of the Health and Safety Division and Association secretary; Dr. J. J. Rutledge, Maryland Board of Natural Resources, member-at-large; and D. C. Kennedy, Bureau of Mines.

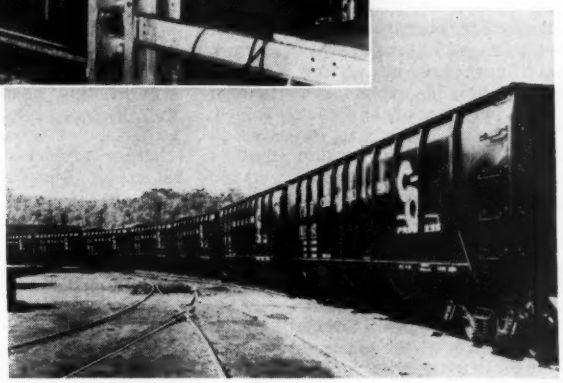
Third Holmes award for safety leadership goes to Dan Harrington



Assembly-line methods speed car production

(Below)

New cars roll off production line at rate of 25 per day



Coal Car Shortage

IN answer to an almost continual clamor arising from coal producers for cars and more cars, American Car and Foundry Co. has developed new assembly-line techniques with completely retrained personnel to produce welded 70-ton coal hopper cars at their Huntington, W. Va., plant. New methods have enabled them to produce 25 or more cars daily towards filling an order for 6000 cars placed by the Chesapeake and Ohio Railway.

Less than four months ago, all cars produced at the Huntington plant were riveted. Now there is over a third of a mile of welds in each car, 670 feet of which are produced by flashless automatic and semi-automatic means. Production is on a precision basis more than ever before, and a finer and more economical hopper car has resulted.

Assembly-line techniques have made possible the speed-up of hopper-car production. In just three hours after the underframe and the car trucks have been joined the car rolls away from the assembly line to the paint track.

Spur Line to Open Kentucky Field

Recently the Chesapeake and Ohio Railway requested authority from the Interstate Commerce Commission to extend its Dawkins subdivision 15.7 miles in Magoffin and Breathitt Counties, Ky. This extension is said to permit development of an area containing an estimated 85,000,000 tons of high-grade bituminous coal and some 40,000,000 ft of marketable timber. Pond Creek Pocahontas Co. announced at the same time that it has agreed to lease and option to lease approximately 25,000 acres of coal land in Breathitt County. Two modern mechanized mines are planned for this territory which are capable of producing some 2,000,000 tons of coal annually.

Plans are being made to install a modern, completely mechanized mine with the latest type of treating plant for the production of the high-grade coal.

Approximately 5,000,000 tons of high-grade steam and domestic coal will be recovered by stripping operations and processed at a separate plant with a capacity of about 750,000 tons a year. Additional stripping ton-

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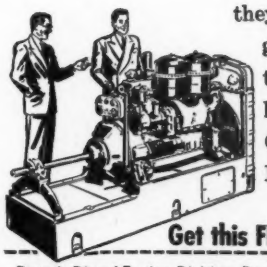

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nage will be available on or adjacent to these properties.

In addition, there are approximately 42,000,000 tons of coal in the No. 3½ Elkhorn seam which underlies this property. Although Pond Creek Pocahontas Co. is not obligated at this time to mine the Elkhorn seam under the terms of the lease, it does have an option to take this coal under the same lease at any time within the 10-year period from the date of the lease. If this option is exercised, coal from this seam may be handled by the preparation plant that will be installed for the strip mine.

Anthracite Mine Water Problem Attacked

During the fiscal year 1949 the Bureau of Mines will expand its activities in the Pennsylvania anthracite region to attempt to devise methods to solve the long-standing mine water problems. Congress has appropriated $396,100 for anthracite studies, of which $323,090 is earmarked for mine-water studies. Work will continue on the conservation of anthracite reserves, more efficient mining and preparation methods, wider uses of different sizes of anthracite, and increased use of mechanical mining methods.

1949 COAL SHOW

Act now to secure your hotel reservation for the Cleveland Coal Show, May 9-12, 1949. Reservations are being handled by Louise D. Perkins, Director, Cleveland Housing Bureau, 511 Terminal Tower, Cleveland 13, Ohio.

Annually about 200,000,000,000 gal of water or 1,821,000 gal daily are handled from anthracite mine workings in the course of normal operations. The average anthracite mine pumps about 13 tons of water to every ton of anthracite mined, and some collieries pump as much as 45 tons of water per ton of anthracite mined. The ratio of water has increased in recent years as records show that 25 years ago the ratio of water pumped to anthracite mined was 8 to 1.

Water studies show that despite extensive and continuous pumping by mine operations, the amount of water contained in underground pools is increasing. The mine-water problem of the anthracite area threatens to cut short the life of the anthracite industry and is already curtailing present production. Research has been expanded to include means of reducing infiltration and flooding of mines, applying mechanical methods of mining, and improving the methods of preparing anthracite for use.

Estimates of the cost of an overall project embracing the entire anthracite region approach $100,000,000. The size of this sum has been one of the factors retarding flood-control projects.

Other problems now being undertaken by Bureau engineers include methods of preventing mine subsidence which has caused considerable damages in many coal-mining areas and work in many phases of mechanical mining.

Nine eastern railroads derive a large portion of their business from the anthracite industry, and more than 1,250,000 people depend directly or indirectly upon the anthracite industry for their livelihood.

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Central States

New Mine Under Consideration

The development of a new mine in Saline County, Ill., similar to a recently-completed mine, is being considered by the Peabody Coal Co. Upon completion the mine will produce approximately 4000 tons of coal a day. Capital investment for equipment is estimated at $2,000,000.

The company also is considering the purchase of continuous coal mining machinery to cut down production cost.

It has been reported to the stockholders that the company is negotiating for the construction of a cleaning plant at Ameagle, W. Va., for the American Eagle Colliery, a 100 per cent owned subsidiary of Peabody Coal Co., at a cost of approximately $1,500,000. These new improvements are in addition to the construction of the new mine at Pana, which the company anticipates will be producing coal by the spring of 1949.

Crestline Dewatering Shows Progress

Towards the end of the third week in June, pumps handling about 13,000 gpm have reduced the water level at the Crestline field near Crestline, Kan., to a depth of 175 ft. Some development work is already under way in the upper level of the Crutchfield lease. Several shafts in the area will be open when the old workings are completely dewatered.

Air Survey of Iron Range

The current airplane survey, with a magnetometer, of the Menominee Range, and cooperative work with the U. S. Geological Survey that has been in progress since 1943, will be the only exploratory work in the iron country by the Michigan Conservation Department's Geological Survey this summer. The Survey's Lansing, Mich., office reveals that the customary summer field investigations by small parties on the ground have been suspended for lack of funds.

Taking up where it left off last year, the plane bearing the magnetic instrument is flying north-south lines a quarter mile apart, and now is working eastward across Dickinson County. The cooperative state-federal aerial survey of iron ore formations last year worked over Gogebic, Ontonagon, and Baraga Counties and part of Houghton County.

The federal aerial survey party includes two pilots and three geologists. Their plane operates at about 500-ft altitude, with the magnetometer let down on a line through the "bomb bay."

Howard I. Young Honored

In recognition of his fortieth anniversary with the American Zinc, Lead & Smelting Co., Howard I. Young, president of the company, was honored by employes at a recent banquet at the Missouri Athletic Club in St. Louis. Present at the banquet were about 140 employes representing almost all the mines and plants of the company and its subsidiaries in Colorado, Illinois, Missouri, Ohio, Oklahoma, Tennessee, Texas, and Washington.

A tray and cigar box of silver purchased from employe contributions were presented to Mr. Young by Charles M. Seymour, Knoxville, Tenn., the company's general counsel. Pointing out that Mr. Young had started his career as a laborer and had worked up through the ranks to a key position in American industry, Seymour described him as "the embodiment of the American success story."

In accepting the gifts, Mr. Young said that the company has grown to the position of the third largest producer of slab zinc in the United States only because all employes have worked together as a team.

"No one man is responsible for the company's success, although you have tried to make it appear so this evening," he declared. "All of us have worked hard to build the company, and that is the only way success ever comes."

He joined American Zinc as a bookkeeper in 1908, was appointed manager of the company's Missouri mines in 1914, manager of all mining operations in 1919, vice-president in charge of operations in 1928, and was elected president in 1930. The company and its subsidiaries now employ about 3,000 persons.

He served as deputy vice chairman of the War Production Board in charge of metals and minerals. He is chairman of the board of the St. Louis Chamber of Commerce, and is a director of the General American Life Insurance Co., the Baltimore and Ohio Railroad, and the Southwestern Bell Telephone Co.

A member of the corporation of Washington University, St. Louis, Mr. Young is also a trustee of Lindenwood College, St. Charles, Mo. He is a member of the general council of the Presbyterian Church in the U. S. A. He also is president of both the American Mining Congress and the American Zinc Institute.

Mr. Young receives token of employes' respect

Synthetic Fuel Survey

Ford, Bacon & Davis, Inc., New York City engineering consultant firm, has been awarded a $110,000 contract to conduct a survey to determine general areas suited for the manufacture of synthetic fuels.

The areas to be surveyed are western Kentucky, northwestern Colorado and southeastern Texas. It is planned to follow this initial contract with a nation-wide survey. The program was requested by the Department of the Interior.

Shafts to Tap Wisconsin Ore Bodies

After churn drilling for over a year in the southwest Wisconsin zinc district, the Calumet Corp., a subsidiary of the Calumet and Hecla Consolidated Copper Co., plans to sink shafts to two of the ore bodies in the immediate future. If this development work confirms the data obtained from churn drilling, a mill will be erected and mining will proceed. Operations are under the direction of Harold Ewoldt, manager of the Calumet Corp.

Diamond Drilling Planned

New developments in mining exploration were outlined by H. H. Stowell, Los Angeles, Calif., before the Deadwood, S. D., chamber of commerce on June 29. Stowell is interested in mining properties in the Strawberry Hill district and expects to start some development using newly discovered methods of detecting minerals. "A scientific approach is being made in mining exploration in the use of aerial surveys which will determine the best places for diamond drilling," Stowell said. It is expected that the program will be long range, with no financial profits in less than five years.

National Lead Offers to Lease Texas City Tin Smelter

In a letter from National Lead's president, J. A. Martino, to Senator Chan Gurney, secretary of the Senate Armed Services Committee, it was revealed that the National Lead Co. stands ready to lease and operate the government-owned "Longhorn" tin smelter at Texas City, if the government should decide on private operation of its war-built plant.

Mr. Martino said that it is highly desirable to have a tin-smelting industry in the U. S. "to free us from complete dependence upon foreign sources for both ore and metal." He added, "Under certain conditions, a tin-smelting industry in the U. S. might be absolutely essential to our industrial economy and hence national security."

Federal Homestake Reopens

The Roanoke Mining Co. is reopening the old Federal Homestake Mine near Baxter Springs, Kan. A derrick has been constructed over the old mill shaft, and ore will be dumped on the ground.

Mining operations will be carried on about the 260-ft level. The shaft has already been recribbed about 60 ft down from the surface. Ore produced will be trucked to the Dines Blue Mound mill, north of Picher, Kan., for treatment.

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Coal and Natural Gas Used in New Iron Ore Reduction Process

H. A. Brassert, president of H. A. Brassert Co., iron and steel engineers, recently disclosed that by utilizing a new direct reduction process, iron ore can be converted to practically pure uncontaminated iron with anthracite or natural gas as fuel instead of metallurgical coke.

Cost of iron produced by this method, according to estimates now prepared for leading manufacturers, amount to only $21 to $26 per ton, compared to pig iron prices of $25 to $40. Dry ice, or solid CO_2 is produced as a by-product of the process at a cost of only $15 a ton. Dry ice is now in demand at $35 to $65 per ton.

Torch Lake Tailings Under Consideration

The industrial value of millions of tons of tailings and stamp sand dumped into Torch Lake are the subject of investigation by the research department of Calumet Consolidated Copper Co., at Calumet, Mich. Although no substantial market has as yet been found, tests have been made for such purposes as grinding wheels, polishing compounds, enameling frits, and roofing granules. Samples have been shipped to possible users for their own tests. Of the two types of tailings, conglomerate and amygdaloid, the amygdaloid type has been used locally for concrete. The red color and hardness of the conglomerate sands may be factors influencing their commercial use.

Car Supply Curbs North Dakota Lignite Production

Lignite mines of North Dakota are limiting their operating rate to integrate it with the supply of hopper cars. In 1947 North Dakota lignite mines produced over 2,000,000 tons from approximately 120 large and small mines. Although most of the production comes from open-pit mines, a portion is produced from shafts and slopes.

New Slope Mine

According to a recent report the Mid-Continent Coal Corp. is developing a new slope mine at Marissa, Ill. A new tipple is included in the development. More than $1,000,000 is expected to be invested in the completely mechanized mine, mill, and tipple.

Oklahoma Strip Mine Opens

Evans Coal Co., recently opened the Evans strip mine at Bokoshe, Okla., in the upper Hartshorne seam. A tipple is under construction for the 1000-ton daily production. Overburden varies from 5 to 50 ft in thickness.

BOOK REVIEW

MINERAL RESOURCES OF COLORADO — *By John W. Vanderwilt and W. M. Traver, Jr.* with a section prepared under the supervision of *W. S. Burbank. State of Colorado Mineral Resources Board. Denver, Colo.* $2.50 1947. 547 *pages.*

PREPARED under the supervision of John W. Vanderwilt, this comprehensive publication covers in detail the mineral wealth of Colorado. The volume is divided into three parts covering metals, nonmetals, and fuels; summaries of mining districts and mineral deposits; and investigations of strategic mineral resources. The wealth of information contained should be of great value to mine operators in Colorado and those who plan examinations of deposits in that state. A series of 44 geologic maps, plates, and diagrams, plus separate mineral deposits maps add great value to the basic material contained.

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New Utah Company Formed

To explore mineral areas located in the eastern section of the Park City mining district of Utah, a new company was formed, according to an announcement by W. H. H. Cranmer, president of the New Park Mining Co. The new firm is known as the General Connor Mining Co., named after General Patrick Connor, 1st Commandant, Fort Douglas, considered by many the father of Utah mining.

The General Connor Mining Co., whose stock will be held entirely by the two organizations with no public offering planned for the present, was formed by New Park and Newmont Exploration; each contributed $50,000. New Park contributed 89 acres of land in the southwest of the East Side Silver. New Park's Mayflower tunnel portal is on this acreage as are some surface buildings but these are not affected by the grant of the new company which secures only subsurface rights.

Newmont contributed 162½ acres comprising the section known as the East Side Silver and a corner of 2½ acres in the Denny fraction.

Rocky Mountain Coal Mining Institute Meets in Denver

Over 200 delegates from five states attended the annual convention of the Rocky Mountain Coal Mining Institute in the Cosmopolitan Hotel in Denver in June. Operating personnel from Colorado, New Mexico, Wyoming, Utah, and Montana, heard R. C. Oliver, president of the group, discuss the struggle for survival between the western coal operators and miners at the opening session of the three-day meeting. He cited the necessity of resolving this struggle if the coal industry is to survive and pointed out how the warfare is hurting the industry as a whole. Oliver also touched on the future of coal mining in the west, in particular, stressing the fact that "coal must meet the threat of fuel oil, natural gas, and subsidized electricity."

The proposed coal mining curriculum at the Colorado School of Mines at Golden—the first such course to be taught at that institution—was explained by A. A. Baxter, associate professor of chemistry and fuel and gas engineering, and C. W. Livingston, professor of mining engineering at the school.

Joel N. Van Sant, safety engineer of the St. Louis, Rocky Mountain and Pacific company at Raton, N. M., discussed the substitution of air-pressure for orthodox explosives in mines. Discussing the geology of the Yampa coal field in Routt County, Colo., N. W. Bass, regional geologist with the U. S. Interior Department, declared there was an undeveloped oil area in the Williams Fork Mountains southwest of Hayden, Colo. Delegates were also shown "The Way Out," a motion picture made by the Goodyear Tire and Rubber Co.

In its final session, F. W. Koelling, of Dawson, N. M., was elected president for the coming year. He is superintendent of Phelps Dodge Corp. operations at Dawson. Vice presidents chosen were F. V. Hicks, general superintendent of mines for Geneva Steel Co., Dragerton, Utah; J. N. Van Sant, Raton, N. M.; W. J. Thompson, Denver, Colo.; and Julius Reuter, assistant superintendent, Union Pacific Coal Co., Hanna, Wyo. A resolution asking that the Senate ratify appointment of Dr. James Boyd as director of the U. S. Bureau of Mines, was also passed.

Expansion in Metaline District

An important event in the recent history of northwest mining took place in Spokane when officials of the Sullivan Mining Co., of the Coeur d'Alene district were elected executive directors in charge of the mining and milling operations of the Pend Oreille Mines & Metals Co. in the Metaline district of northeastern Washington and southern British Columbia. The change in management followed the Sullivan company's purchase of 700,000 shares of Pend Oreille stock at $5 per share, involving $3,500,000.

At the annual stockholders' meeting the Pend Oreille company reelected its former president, Lewis P. Larsen, who organized the company and pioneered the development of the Metaline field. They then elected as directors the following Coeur d'Alene men who were connected with the Sullivan company, a subsidiary of Bunker Hill and Hecla: Stanly A. Easton, president of Bunker Hill, chairman of the executive board of directors; J. B. Haffner, resident manager of Bunker Hill; L. E. Hanley, president of Hecla and Polaris Mining companies; A. W. Witherspoon, president of the Old National Bank and vice president of Hecla; Wray D. Farmin, director of Day Mines, Inc. W. L. Zeigler, who was connected with the Hecla and Sullivan company as chief millwright and mill superintendent, was placed in full charge of the Pend Oreille operation.

The company is building a 1000-ton capacity milling plant at the Reeves-McDonald mine in British Columbia and intends to step up production at the Metaline Falls mill from 800 to 2000 tons per day and plans on a yearly production of around 1,000,000 tons of zinc-lead ore.

Gold Purchased at $45 Per Ounce

Frank Lilly, president of the American Hard Money Association, and a leading mining statistician of Spokane, Wash., recently purchased 620 ounces of newly-mined Alaska gold for $25,240, or $6200 more than the U. S. Treasury would pay. Mr. Lilly's was the first big gold transaction since recent publicity on Treasury regulations under which a private citizen can buy and sell gold in its natural state.

Dig, Haul & Lift

Sauerman Slackline Cableway powered by 20 hp. motor moves tailings from dump pile to bin on hillside.

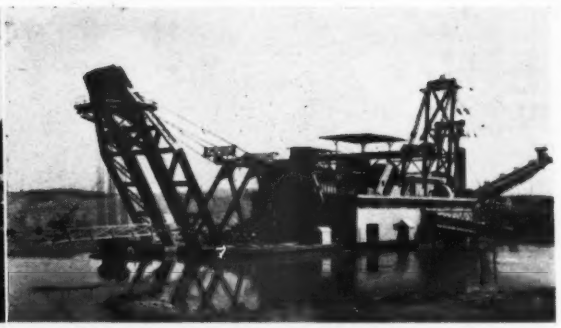
The Sauerman Slackline Cableway is a digger, conveyor and elevator all in one. It utilizes a round bottom excavator bucket that is chain-suspended from a carrier running on an inclined track cable and is equipped with a simple dumping device which permits automatic dumping at any pre-determined point along the track cable.

After dumping its load, the empty bucket is carried by gravity back to the digging point. The track cable swings around a central mast or tower in a wide arc, the radius of which may be as much as 1200 ft., and the bucket digs and delivers wherever the operator wishes within the radius.

Ask for Catalog 19-C.

SAUERMAN BROS., Inc.
540 S. Clinton St. CHICAGO 7

Idaho-Maryland mine boasts scenic setting



Yuba Consolidated's Hammonton dredge digs 112 ft below water level

San Francisco Program Takes Shape

(*Continued from page* 53)

ladies to Muir Woods, across the Golden Gate bridge, through the splendid giant redwoods of California. A drive through the beauty spots of Marin County and back to San Francisco will make it a full day. On Wednesday the ladies will travel to the Clairmont Country Club for a special luncheon in sight of the spectacular San Francisco-Oakland bay bridge.

A series of trips have been planned for the men that offer them an excellent opportunity to see regions of importance to California's early mining history as well as current mining operations of the state.

Trip number one, September 24-25, will take visitors to the Yuba dredge fields on the first day and ample opportunity will be provided for inspection of the world's largest dredge at Hammonton. On the second day the Idaho Maryland gold mine and mill will be visited when plenty of time will be allowed for full inspection. Those who wish to visit the mine will require digging clothes.

Trip number two, September 24-25, will cover the Yuba dredge fields on the first day and the Pacific Gas and Electric Co.'s operations on the Feather river water-power development. There the Cresta and Rock Creek tunnels are being driven with the most modern equipment and methods at record speed. Here again digging clothes will be necessary for those who want to visit the working faces.

A third two-day trip, September 24-25, will take in the historic Mother Lode region including many of the sites immortalized by Mark Twain and Bret Harte. The second day of this trip will take the voyagers to Sutter's Creek where a visit will be made to the Central Eureka mill and surface plant.

On Friday, September 24, a one-day trip will take in the gold dredging operations at the Folsom fields. Those interested in the heavy industry area of upper San Francisco Bay may take a one-day trip on Friday across the Bay bridge for a tour including the large steel mill of Columbia Steel Co., Dow Chemical's electro-chemical plant, Shell Development Co.'s works, and many other interesting operations.

All planning to take in a field trip are urged to make immediate reservations to avoid disappointment and to provide the Trips Committee with advance information from which to base proper arrangements.

Everyone interested in metal and nonmetallic mining owes it to the mining industry, to his employer, and to himself to participate in this top-notch meeting of vital importance to mineral industry progress.

Long Range Development Under Way in Cripple Creek

With the object of draining the Cresson and Vindicator properties below existing workings, a joint development project, now well under way, has been undertaken by the Golden Cycle Corp., the United Gold Mines Co., and the Cresson Consolidated Gold Mining & Milling Co., operating in the Cripple Creek District, Colo. Preliminary exploration of areas never before examined in depth is being accomplished at the same time. Also, the Ajax shaft of the Golden Cycle Corp., is being extended to the level of the Carlton Tunnel to facilitate future development of the Ajax property in depth. From the Carlton Tunnel level two laterals are being driven from the 3250-ft level of the Portland No. 2 shaft of the United Gold Mines Co., one toward the Cresson shaft and one toward the Vindicator. These laterals are the logical extension of the Carlton Tunnel to obtain full benefit from the six-mile project completed in the first year of the war. Waste from the lateral and from the Ajax shaft extension is being hoisted through Portland No. 2 shaft.

Ten men, divided into a drilling crew, mucking crew, and station crew, are employed in driving the lateral. With modern mechanized tunnel driving equipment, one round per shift is being completed in each heading with an average advance of 5½ ft per round.

Using a two-drill carriage, the drilling crew drills and blasts one heading in the morning and another in the afternoon in the other heading. The mucking crew, using an Eimco loader, alternates in mucking out the headings. Ample ventilation has been provided and the system is working out well.

About 3000 ft remains to be driven to reach the projected position of the Cresson shaft, and 2600 ft more tunnel must be driven to reach the Ready Money vein system of the Vindicator-Golden Cycle property. Completion of this work, together with the decision to move the Golden Cycle mill to the Cripple Creek District, will enable the operating companies to offset, in part, the ever-increasing cost of gold mining.

California Silver Mine Changes Hands

The United States Smelting, Refining and Mining Co. has purchased the Cox silver property from its owners, William Umbenhower, of Parker, Ariz., and L. C. Cox, of Pasadena, Calif. The Cox mine is located in the Coxscomb Mountains of Riverside County, Calif.

About six months ago Umbenhower reopened the Cox mine, which had been idle for many years, and started a new development program, which resulted in the discovery of high-grade silver ore. To date, 11 carloads of ore averaging $100 a ton in value have been shipped and two additional carloads are ready for shipment.

Fractured Section Shows extreme hardness and fine martensitic structure extending to the inner core.

IT TAKES A GOOD BALL TO CUT GRINDING COSTS

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ALLOY STEEL — FORGED — HEAT TREATED

Grinding costs are an all-important profit factor—particularly when you work low-grade ore. And that's where *good* grinding balls like Moly-Cop make the difference.

MOLY-COP Balls give you these five proved advantages:

1. Your grinding media costs less per ton of production.
2. Your mill liner wear and replacement cost is lower.
3. You use less power per ton of ore.
4. You get a finer grind because Moly-Cop Balls wear evenly and retain their spherical shape.
5. Your handling and freight costs are lower because fewer charges are needed.

Moly-Cop Balls have demonstrated their ability to lower costs in mills in the United States and in the larger mining countries of the world. Remember—it takes a *good* ball to cut grinding costs, and Moly-Cop is a good ball.

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Uranium Tests on Public Lands

An order withdrawing from entry and reserving for use of the Atomic Energy Commission approximately 115 square miles of public lands in southwestern Colorado and southeastern Utah has been approved.

During this summer the Commission, with the cooperation of the U. S. Geological Survey, intends to study these areas and diamond drill favorable locations for uranium bearing ores. Lands found to contain no uranium will be released from the withdrawal orders and will again be opened for entry.

In accordance with AEC policy the lands found to contain uranium will become available for development and mining by private interests under arrangement with the Government. No further withdrawals are contemplated at this time until lands already withdrawn have been thoroughly examined and arrangements made for their development or relinquishment.

San Xavier Shaft Nears Completion

The Eagle-Picher Mining and Smelting Co. expected to have the new three-compartment shaft at its San Xavier mine completed and in operation at an early date. The San Xavier is being worked on a three-shift basis, with production averaging about 5800 tons of lead-zinc-copper-silver ore monthly.

Ore from San Xavier is milled in the company's 400-ton Sahuarita mill, located 10 miles from the mine. In addition, the mill handles considerable custom material.

Silver Crescent Begins Work

Fully equipped with an operating 150-ton concentrating plant and the necessary mining equipment, the Silver Crescent Inc., at Moon gulch in the Yreka mining district, Shoshone County, Idaho, has started work.

East Utah Tunnel Makes Progress

In a recent report of company operations Carroll Searls, secretary and director of East Utah Mining Co., and an officer of Newmont Mining Corp., reported the East Utah tunnel to be in 3180 ft from the portal and gradually getting into better ground. He stated the cost per foot for drifting is a little more than $60 and that funds are sufficient for at least 3000 ft more work. Adequate facilities for handling water drainage through the tunnel have been provided and the water has been reduced from 1200 gpm to about 600 gpm.

Old Idaho Producers to Reopen

The Apache Mining Co., composed of a group of southern Idaho businessmen, has undertaken the reopening of a group of 20 old silver-lead producing mines near Hailey, Idaho, according to Frank R. Plughoff, engineer, and H. P. Payne, general manager. The company plans on moving two milling plants into the district, one of which is expected to be in operation this year.

Three New Veins Furnish Sunshine Ore

The Sunshine Mining Co. is producing ore from three new vein systems outside of its own Sunshine vein, notably in the Chester vein system north of Sunshine and the Silver Syndicate and Yankee Girl vein systems south of Sunshine, in all of which Sunshine owns substantially large interests. The Chester vein has been a big producer of rich silver-copper ore since 1943. The Silver Syndicate is a high-grade silver-lead vein known to be at least 900 ft in length and is just now getting in shape for steady production. The Yankee Girl vein is another silver-copper vein containing commercial ore for a length of over 1000 ft. So far a limited production has come from development work on the 3100 level, but is now being opened for stoping operations. Sunshine is also opening this vein with a crosscut from the 3700 level.

San Manuel Makes Progress

Development of the San Manuel Copper ore body near Tiger, Ariz., is progressing according to schedule, according to a statement by W. P. Goss, general manager of the San Manuel Copper Corp. The No. 1 shaft has been sunk to a depth of 72 ft and concreting of the first 50 ft has begun. The erection of the headframe and sinking hoist will follow soon. At the power plant, three gas-Diesel engines have been set on their foundations, and the first unit is in operation.

Utah Mine Fire Under Control

P. H. Holland, superintendent, said work will resume in the Horse Canyon mine of the Geneva Steel Co., after fire and safety crews reported a blaze 5000 ft underground under control.

Crews worked for 11 hours to seal off the portion of the mine which was ablaze.

Fulton Brattice Cloth is mildew, fungus, and rot resistant. Its uniform and lasting qualities and economy are well established. Fulton Fireproof Brattice Cloth is made in two weights, and in widths from 36 to 96 inches. Leading mine supply houses in all coal fields stock Fulton Brattice Cloth. Immediate shipments are available from our plant nearest you.

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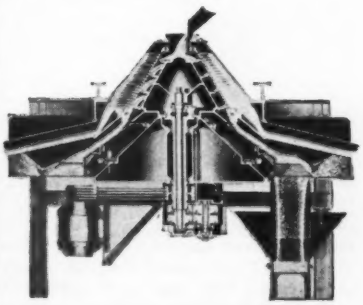

CENTRIFUGAL AND MECHANICAL INDUSTRIES, INC.

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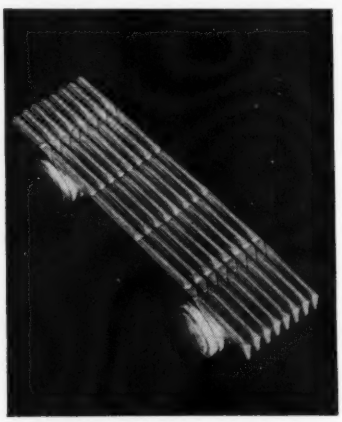
Manufacturers Forum

Wedge Wire Screens

For mining, manufacturing, and processing plants, the Cambridge Wire Cloth Co., Cambridge, Md., offers wedge wire screens which are said to offer greater freedom from clogging.



Two types of surfaces are available; the flat suface, made from flat-topped wires to form a smooth unbroken surface, and the "riffle-surface" type.

Lifting Magnets for Steel Handling

The Cutler-Hammer, Inc., Milwaukee, Wis., has announced availability of an electric lifting magnet for mounting on anything that moves having a boom and source of electrical power. The mounted magnet is said to provide a fast, easy, and economical method of handling castings, borings, turnings, pig iron, car wheels, steel shafting, scrap, etc.

New Mine Hose Announced

For the rugged service encountered in mining and quarrying operations Manhattan Rubber Division of Raybestos-Manhattan, Inc., has developed the Condor Homo-Flex duty air hose. According to the manufacturer, it has an extra strong tube compounded of Manhattan oil-proof flexlastics, two braids of heavy strength member, and a thick abrasive resistant oil-proof flexlastics cover. It is said to retain the feature of flexibility for which the Condor Homo-Flex design is noted. Two sizes, ¾ in. and 1 in. inside diameters are being made with working pressures of 350 and 300 lb.

Electric Power Center for Mines

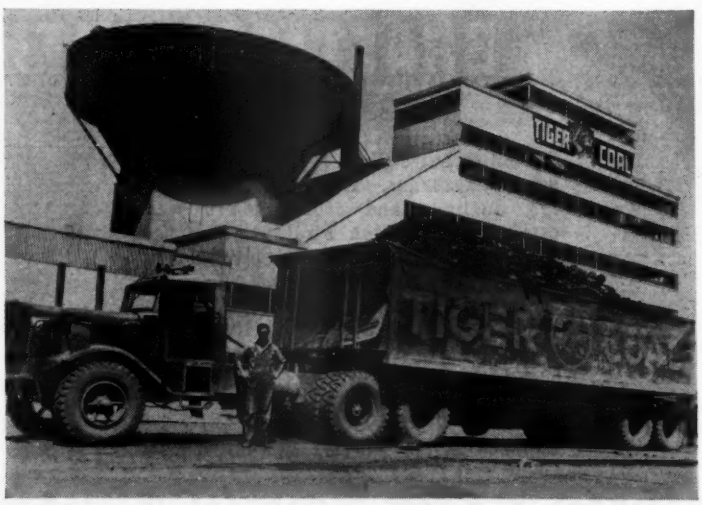
A three-phase, portable, explosion-proof, electric power center for low-height, underground mine service has been announced by Westinghouse Electric Corp. The unit has been designed with both high and low-voltage plugs and receptacles. Electrical connections are said to be made easily by the mine electrician in a few minutes. A nitrogen-filled, pneumatically-sealed case protects the unit from explosion, dirt, falling objects, corrosive fumes, or moisture. The transformers are skid mounted for pulling to new positions by a tractor or hoist. These new units weigh only about half as much as the equivalent oil-cooled transformers.

Screw-on, Chisel-type Rock Bits

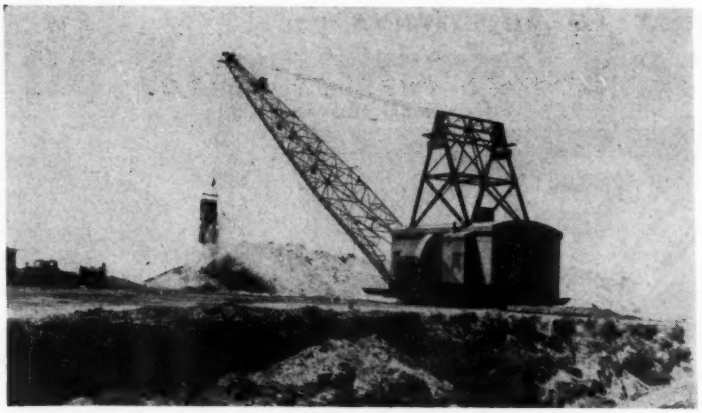
A series of six sizes of chisel-type rock bits that may be screwed on standard drill rods is now available from Kennametal Inc., Latrobe, Pa. The Kennametal cutting edge of the bit is held in the body by a mechanical method without brazing. The bits are offered in 1⅜-in., 1½-in., 1⅝-in., 1¾-in, 2-in., and 2¼-in., sizes. According to the manufacturer, no conversion of existing equipment is necessary to use the bits. Increased drilling speeds are claimed and the life of the bit is reported to range up to 100 times that of steel bits.

Wire Rope Chart

R. G. LeTourneau, Inc., has published a Tournarope Wall Chart listing the types, construction, and application of various ropes in the earth-moving, hauling, and equipment field. Cable requirements for different types of scrapers, dozers, cranes, and rooters are listed. Copies may be had by writing to any LeTourneau distributor or to the company at Peoria, Ill.



This 80-ton trailer, built of Mayari R low-alloy, high-tensile steel, was first put into service by Hume-Sinclair Coal Co. early in 1937. It has been in operation an average of 280 days a year, and only minor repairs have been required. Several other size trailers built by Hume-Sinclair Coal Co. have been built of the same material and have given splendid service



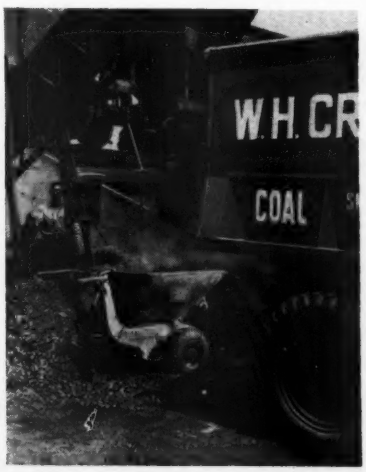
New Model Walking Dragline

In a new addition to its line of walking draglines, the Bucyrus-Erie Co., claims design features for sustained delivery of big yardages day-in and day-out. Called the 450-W walker, the new dragline is reported to balance weights and loads so that the center of gravity shifts in a limited range, keeping base rim pressures low. Walking is permitted in any direction to positions most effective for digging. Large area base and shoes, coupled with proper weight distribution, are said to make possible walking and working on soft ground in all kinds of weather.

The new unit swings 8 to 10-cu-yd buckets from 200- to 165-ft booms. With an 8-yd bucket and 200-ft boom, it can move material 407 ft without throwing the bucket. The unit is supplied with a heavy-duty Diesel engine and has air-operated clutches and brakes. Swing machinery is under Ward-Leonard variable-voltage control.

Mechanized Wheelbarrows

Mechanical wheelbarrows, powered by 3 hp, air-cooled motors were recently introduced by Bell Aircraft Co., Buffalo, N. Y., to be distributed by the Dravo-Doyle Co., Pittsburgh, Pa., in western Pennsylvania and parts of West Virginia. The rubber-tired wheelbarrow is said to carry about three times as much coal—roughly 600 lb—as an ordinary hand-pushed one. It does not have to be lifted to empty the contents. One of the first mechanical wheelbarrows in western Pennsylvania was recently acquired by the Champion Coal Co. for yard service. The machine runs eight hours on three gallons of gasoline. Top speed is about the same as a fast walking pace. This new unit is called the "prime mover."



— *Announcements* —

P. F. Bauer, Vice-Chairman of the Manufacturers Division of the American Mining Congress, has been named manager of a newly-formed central region of **Allis-Chalmers** general machinery division with headquarters in Cleveland. Mr. Bauer joined the Allis-Chalmers organization in 1928 and before undertaking his new duties on July 1, was manager of the firm's industrial sales department with headquarters in Milwaukee.

* * *

Nelson L. Davis Co., Chicago, announce the appointment of **George S. Jaxon,** sales manager. Mr. Jaxon is a well known coal preparation engineer who has been identified with the coal industry for over forty years. He will direct his entire efforts to the company's heavy media process-float and sink separation, with headquarters in Chicago.

S. M. Parmley, who for many years has been active in the coal preparation field, has joined the company as consulting engineer.

Harold T. Anderson has been appointed assistant to the general sales manager in charge of sales production relations with the **Worthington Pump and Machinery Corp.,** effective July 1.

* * *

A. L. Hawk has been appointed assistant to the western district manager in Chicago and **R. B. Hazard** has been appointed as manager of distributor sales, western district, of **Raybestos-Manhattan, Inc., Manhattan Rubber Division.**

* * *

Kendall L. Vinton, formerly manager of the Peoria, Ill., branch of **Cummins Diesel Sales Corp.** of Ill., has been appointed manager of the Omaha dealership.

* * *

Danforth K. Heiple, field engineer for **R. G. LeTourneau, Inc.,** since 1945, has been promoted to position of chief field engineer for the company.

CATALOGS AND BULLETINS

DIESEL TEXTBOOK. *Hercules Motors Corp., Canton, Ohio.* Contributing to a broader knowledge of the modern, high-speed, heavy-duty diesel engine, this book explains in detail the fundamentals of diesel power and its advantages. An enlightening series of illustrations show how diesel engines function. All of the vital subjects pertaining to diesel engines and their component parts are analyzed and illustrated with charts and diagrams. Copies will be sent to those applying to the company.

MINE SUPPLIES, PARTS, AND EQUIPMENT. *National Mine Service Co., Beckley, W. Va.;* Logan, W. Va.; Jenkins, Ky.; and Forty Fort, Pa. This second monthly report will be mailed upon request to those who wish to obtain complete information on the equipment the company has available.

REVIEW OF HEAVY EQUIPMENT. *Allis-Chalmers Manufacturing Co., Milwaukee, Wis.* A 1947 annual review of engineering developments at Allis-Chalmers commemorates the 100th anniversary of the company. The review covers a wide variety of equipment produced for many industrial fields including coal and metals. The readers may obtain copies by applying directly to the company.

STORAGE BATTERY RESEARCH. *Gould Storage Battery Corp., Trenton 7, N. J.* The first complete research laboratory and development-pilot-plant in the storage-battery field is described in a 16-page illustrated booklet entitled "Better Batteries for Industry Through Research." This booklet describes the research, control, and testing unit of the company which is actually a pilot manufacturing plant which can make as many as 300 batteries per day in unusual and odd designs constructed for special test purposes. Methods by which battery metals are analyzed and controlled through the use of the ultraviolet spectrograph and densitometer and other equipment are described in this brochure. Copies of the pamphlet are available upon request.

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Our specialty—Testing bituminous coal lands
Satisfactory cores guaranteed.

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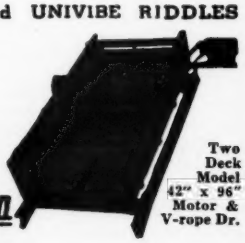

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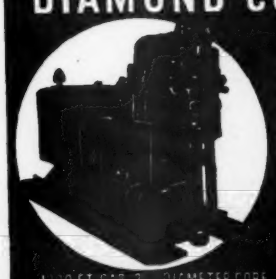

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The Kennametal Rock Bit

New through and through

The Masterpiece of Modern Rock Bit Construction . . . Now Ready to Bring You Great Performance

The completely new Kennametal Rock Bit is here. It's now ready to give you greater performance, to show you big overall savings in drilling cost, and to offer increased drilling speeds in the hardest rock you drill.

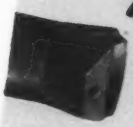
The Kennametal Rock Bit can be used on hand-held drills, stopers, drifters, or wagon drills without a single conversion. Performance records in many mines show that quartzite, granites, hard limes, sandstone, and other similar rocks are drilled 20 to 30 per cent faster and the bit stays sharp up to 100 times as long. The same size Kennametal Rock Bit drills holes to their full depth. It eliminates bit changes due to gage reduction because gage losses are in thousandths of an inch.

The blade or cutting edge is solid Kennametal, the metal that is nearly as hard as the diamond. It resists wear and abrasion, and it takes the constant hammering stresses of drilling in hard, tough, solid rock without failing.

The Kennametal Rock Bit has the exclusive feature of mechanical blade holding which increases bit life, lowers bit cost, and gives longer, better service.

Sizes are 1⅜", 1½", 1⅝", 1¾", 2", and 2¼".

Write for complete information today.



New Mechanical Blade Mounting

Mechanical blade holding is an exclusive Kennametal Rock Bit feature that eliminates stresses in the cutting edge of the bit . . . gives it longer life.

New Stress Flow Construction

"Stress Flow" applies ideally to the way the Kennametal Rock Bit is designed to handle stress action in the bit body. A big advantage for increasing bit performance and reducing bit cost.

New Super-Tough Steel Body

Special steel is used to back up the hard, long-wearing Kennametal insert so the bit will give longer service, drill better.

New Threaded Connection

Kennametal Rock Bits screw on F, H, and D threaded drill rods. And the bit can be used on heavy or light machines. No conversions are necessary to use the bit.

KENNAMETAL

The World's Largest Manufacturer of Cemented Carbide Mining and Drilling Tools

Mining Division—KENNAMETAL Inc., Latrobe, Pa.

It is *Completely* Proved

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